Arms, Men, and Military Budgets

Issues for Fiscal Year 1981

NATIONAL STRATEGY INFORMATION CENTER, INC.

ARMS, MEN, AND MILITARY BUDGETS

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Preface

Frank R. Barnett

One of the National Strategy Information Center's (NSIC) first publications, in 1971, was entitled *The Military Unbalance*. It was based on a supplemental report of the Blue Ribbon Defense Committee that included such luminaries as Lewis F. Powell, Jr., presently associate justice of the Supreme Court of the United States, and the Honorable William P. Clements, Jr., current governor of Texas. That report, nine years old, predicted with precision the adverse military trends that in 1980 have become evident to the President and the secretary of defense.

This is the fourth edition of *Arms, Men, and Military Budgets*, and it reaches the public at a moment when the question of national security intrudes upon every agenda. The authors of these successive works can take satisfaction in noting that historical trends have confirmed their analyses. Indeed, some critics of earlier editions of this book—who "felt" the findings were too bleak—are now scrambling to voice audible cries of alarm over the Soviet military threat, newly discovered through utopian lenses. Conversely, the "hawks" of yesteryear are now seen to be prudent men who, if anything, underestimated the readiness of Moscow to use raw power in support of undisguised aggression.

More gratifying--certainly to those who have been skeptical of the CIA's track record in analyzing Soviet military capabilities and intentions—is the rumor from reliable sources that current CIA estimates are slightly more pessimistic than the projections for this period in history of the valiant, though much criticized, "Team B." This will scarcely lead to apologies to Dr. Richard Pipes and his sturdy colleagues from the waspish larks who vilified B Team scholarship. But it should be part of the record that the B Team was more nearly right than its in-house competition, and perhaps President Carter, in his new wisdom, might consider reviving both the President's Foreign Intelligence Advisory Board (PFIAB) and the practice of competitive analysis.

Given the present matrix of synergetic crises, it is scarcely our purpose to recommend that doves be put in the intellectual stocks or even to require them to print a "mea culpa" in the pages of *Foreign Affairs and Foreign Policy*. The proverbial quarter-of-an-hour to midnight may have arrived. There is only time, in extremity, to strive mightily to rebuild the national consensus that served so effectively in the Truman and Eisenhower years. Let even Republicans rejoice, therefore, because President Carter has changed his mind 180 degrees on the nature and intentions of the Military-Commissar Complex in Moscow.

Some business leaders still lag behind the president in improving their understanding of the "culture gap" that divides the American experiment with unlimited options from that barbarian state whose only efficiency lies in concentrating and deploying force for the benefit of Marxist Czars. Hopefully, United States opinion leaders in many fields will now recognize that the Soviets march to a different drummer. It is not the benign thump of a gavel in an Anglo-Saxon law court, but a primordial beat from the Tartar steppe. It is an echo of the Mongol march whose armies butchered Central Asia as casually as the Red army kills Afghan tribesmen today under the banner of "Scientific Socialism."

"Is America still number one but slipping, or already clearly number two?" Politicians and experts with equal access to data continue to disagree. But, in the past year, there have been "defectors" to the growing ranks of cautious pessimists. Not the least is former Secretary of State Henry Kissinger who, at a Center for Strategic and International Studies conference in September 1979 in Brussels, (a) conceded that détente had failed to tame the Soviet appetite for protracted conflict, and (b) renounced MAD, a doctrine the secretary himself had helped to sanctify. Dr. Kissinger's candid

and courageous rethinking of the premises of United States policy vis-à-vis Moscow has made it legitimate for lesser pundits to partly recant their own overly sanguine assessments of Commissar behavior patterns. Thus, a wide spectrum of leadership now calls for increased military spending and united resolve to go beyond rhetoric or lightweight economic sanctions—if necessary—to preserve the conspicuous vital interests of the United States, our major allies, and those Third World countries who prefer to risk their political and economic futures with American investment dollars rather than with Soviet inputs of airborne armies.

In what may prove to be a SALT-free milieu, hawks may also have to reexamine their own articles of faith. (The Straits of Hormuz perhaps deserved more of their security attention than the Panama Canal.) The MX missile, once deemed the "necessary price" for ratifying SALT II, is still valuable as a *missile*, but the racetrack basing mode may now possess the military utility of a herd of white dinosaurs and at an ultimate cost—factoring in inflation, false starts, EPA regulations, and so forth—of as much as $65 billion. For substantially less, the nation could rapidly deploy at least three systems that would dampen the aspirations of "first-strike" planning elites in the Kremlin. First, we should reclaim the promising investment, design, and testing of the past that is still relevant. For example, a "derivative" strategic weapons launcher—using the costly R&D and avionics of the B-1 bomber but at significantly less cost—could be ready by 1983. Simultaneously, we could also dig "shadow" silos around *existing* Minuteman sites—a "shell game" that would be ready by 1983, instead of 1988 when the extravagant MX system would take final and perhaps futile shape. In addition, the "conservative" bureaucracies in the Pentagon owe it to the country to reexamine the Navy's tested concept of "water-launched" weapons—i.e., missiles that can be fired using nothing but the surface of the sea as a platform and that can be carried in surface naval vessels or even merchant ships that cost substantially less than the price tag of $1,200 million for a single Trident boat.

The Soviets have SS-20s, the "medium" range Backfire, and beyond that their own version of the intercontinental B-1. They have more tanks, more artillery, more submarines, and more airborne troops. Clearly we need more defense spending to be able to cope. But not necessarily on "status-quo" systems advocated by some segments of our military. The nation's security will not be advanced if the pendulum of civilian opinion swings from (1) uncriti-

cal denunciation of the Pentagon for the Vietnam debacle to (2) mindless enthusiasm for the strategic wisdom and pet weapons of some military leaders. To repeat a comment from an earlier edition of this book: the Pentagon, in the long run, may be damaged more by indiscriminate hurrahs from the grass roots than the ill-informed diatribes of the Jane Fonda cult group. What the Department of Defense needs as urgently as more funds are groups of "friendly gadflies" with an unorthodox flair who share DOD's concern with Soviet military power but want clearer strategy, improved doctrine, missions more in tune with the geoeconomic realities of our era, and "innovative" and even "improvised" weapons. (Not so elegant, perhaps, but easier to maintain on the battlefield and deployable in a "quick-fix" mode.)

The *sine qua non* is to deter the Soviets in the *next three years* while we are readying the long-range *big* systems that come on stream toward the end of the decade. There is much publicity now about the design of a 110,000-man intervention force for the Middle East that may require two to three years to complete. But Saudi morale, the destinies of Oman and Kuwait, and perhaps President Sadat's career cannot wait so long. Would it not be useful to "think small" at first about how to put a package of, say, 5,000 Marines into Oman, fighter bombers on Sinai bases, 2,000 Army commando types with psywar capabilities into Egypt, and a few warplanes on Masira—just outside the exit to the Persian Gulf? And why not a Volunteer Foreign Legion of 15,000 professional soldiers from Taiwan and South Korea in Saudi Arabia, perhaps with American and Saudi officers?

By all means, prepare the big batallions and the airlift to get them to the cutting edge. (We may well need a corps of at least 110,000 men if, in some short-term future, the Soviets plan to "overload" Washington with two crises at the same time—putting Cubans and East German paratroops into Zaire while backing Vietnam Legions as the "Cubans of the Pacific" against Thailand.) But while we are designing large-scale logistics for such large solutions, surely we must innovate smallish remedies for the year 1980. And we must do it now!

Are there American reservists (professors, journalists, engineers, and agro-specialists) who have lived in the Middle East and speak Arabic or Farsi? Are there United States career officers whose "buddies" at Benning or Leavenworth were from among the military elites of the Islamic world? Are there retired United States admirals who can call by first name the sheiks, sultans, and emirs of the oil theater? If so, can a handful of such men with unique

connections be mobilized for unofficial diplomacy or transnational politics? (There is nothing sinister or un-American about this. It is just the sort of casual activity that New Yorkers in an election year sponsor informally in Idaho, Iowa, and West Virginia.)

One hopes that legendary Southern audacity and Yankee ingenuity might jointly be applied to the *rapid* defense of the Persian Gulf "fuel-tanks." Absent speedy action, the industrialized democracies of the northern hemisphere and the oil-poor LDCs as well may have their energy "lifelines" severed by Soviet surrogates, Gorshkov's navy or Soviet airborne armies. Moreover, a so-called crash program need not be of the magnitude of the Manhattan Project or the D-Day landings. (It might even be relevant if President Carter reread the exploits of Colonel Mosby, the gray ghost of Virginia, or asked Admiral Stansfield Turner to remind some senators that Ben Franklin not only flew kites in electrical storms but practiced the clandestine and covert arts to finesse into being his underdog revolutionary enterprise of 1776.)

Let us reiterate to those wary observers of Soviet expansion whose predictions were accurate: "Well done, but there is limited comfort in being correct about enemy strength if we lag in practical counteraction."

There is an apocryphal story about a prescient Army scout who repeatedly tried to warn General Custer before the Little Big Horn battle. As both he and his commander were struck by half a dozen arrows, the scout shouted: "I *told* you Crazy Horse was aiming at superiority, not parity!"

The job now is to *find solutions*, rather than simply to sound alarm bells or threaten. In the past, decision-making was enervated by those who assured us that "the Russians will level off, consolidate, resist adventurism, and entrap themselves in consumerism." We are currently in danger of being further crippled by prophets of error who now assert that "even if it's true the Soviets are building superior forces, there's nothing we can really do about it except spend more money routinely on hallowed systems."

The collapse of SALT restraints and the manifest onset of the Soviet-sponsored *Resource War* against the minerals of South Africa and Middle East oil may call for breakouts from conventional parameters of weapons and force planning as well as doctrine. That is why the authors of the current edition of *Arms, Men, and Military Budgets* have focused much of their attention on summarizing what must and can be done.

Frank R. Barnett
President, National Strategy Information Center, Inc.

1.

Summary and Conclusions

Francis P. Hoeber and William Schneider, Jr.

"The current and projected US defense posture is inadequate to meet the threat posed by the Soviet Union." This was the opening sentence in the first issue in this series of volumes.[1] Tragically, the statement has far greater strength and validity today, five years later. There can no longer be any doubt that with the continuation of current trends, the Soviet Union will have usable—diplomatically or militarily—superiority over the United States in the early 1980s, that it already has massive and growing superiority in capabilities for ground warfare, equal or superior tactical air capabilities, and a Navy more numerous in ships, catching up in tonnage, and superior in some important fighting capabilities.

The threat posed by the Soviet strategic and general purpose forces, and the US programs urgently needed to meet these threats, are discussed in the next three chapters and are summarized below. In this chapter we also discuss the trends in the US and Soviet military investment that have brought about these dangerous and still growing disparities.

STRATEGIC FORCES

Under planned US strategic programs, the Soviet Union will enjoy a decisive measure of strategic superiority in the early 1980s.

This is now evident from published Department of Defense (DOD) statistics, and is now codified in the text of the Strategic Arms Limitation Treaty (SALT) II.[2]

The SALT II Treaty will *not*:

- Establish Soviet-American parity or equivalence through 1985 in numbers of MIRVed ICBMs, ICBM warheads, force megatonnage, total throw-weight, hard target kill capability or area (i.e., soft) target kill capability.
- Eliminate first-strike instabilities due to the Soviet counterforce advantage.
- Improve the prospects for a more equitable SALT III Treaty.
- Control the number of ICBMs, the number of warheads, the number of medium Soviet bombers capable of striking the US.
- Protect military and scientific cooperation with US allies.
- Support US nuclear nonproliferation objectives.
- Reduce either Soviet or American defense expenditure.

The Treaty has, however, served the useful purpose of reopening the US debate on the long (unilaterally) disregarded issue of the US strategic posture and its future adequacy.

Because Soviet superiority and, specifically, the threat to the US land-based ICBM force will become acute by 1982, the most urgent strategic program requirements are for a series of "quick fixes" that can diminish US diplomatic and military vulnerability to Soviet strategic nuclear power in the early 1980s. These quick fixes include the following:

1. Rapid deployment of multiple aim points around existing *Minuteman* silos, with conversion of *Minuteman* missiles to a transportable configuration for deployment in multiple protective structures.
2. Restart of the *Minuteman III* production line and warhead production, with improved delivery accuracy capability.
3. Increase research and development (R&D) on ballistic missile defense, and maintain a standby readiness to deploy a low-cost distributed low-altitude defense system that can be employed (using "preferential defense" tactics) to protect US land-based ICBMs deployed in a multiple protective structures mode.
4. Disperse the US bomber force to inland bases. Increase alert rates on both the bomber and submarine-launched ballistic missile forces.

5. Restart the B-1 production line for several versions, with priority on a cheaper, subsonic penetrating bomber and a cruise missile carrier more effective than the proposed B-52 cruise missile carrier or a modified wide-bodied transport aircraft.
6. Recoup program delays in the *Trident I* missile, the *Trident* submarine, and the air-launched cruise missile programs.
7. Rebuild US continental air defenses with additional E-3A (Airborne Waring and Control System) aircraft, the deployment of F-14A/Phoenix air-to-air missiles, and the *Patriot* surface-to-air missile system.
8. Initiate a serious US civil defense program.
9. Move rapidly to modify US strategic doctrine that will restore the ability of the US to deter war credibly through the establishment of a genuine ability to conduct a nuclear war, should deterrence fail.

These quick fixes will add $6 to $10 billion per year, on an average over the next three years, above present programs. They should not, however, be permitted to impede long-term work on:

- An accelerated MX program in a multiple protective structures mode, rather than the costly "race track" mode currently proposed.
- A smaller SLBM submarine.
- The accelerated deployment of a *Trident II* missile.
- R&D on antisatellite systems, high-energy lasers, particle beam weapons (both terrestial and space-borne) and follow-on bombers and ballistic missile systems.

Such programs may mean strategic expenditures approaching a total of $30 billion per year, or approximately the level in real terms expended prior to the Vietnam conflict. Nevertheless, they would permit long-term savings because they would persuade the Soviets that it would be fruitless to continue to invest in strategic forces to achieve high-confidence strategic superiority, and by restoring a credible nuclear guarantee for US allies, reduce the requirements for large-scale nonnuclear conflict. These programs are made necessary by 15 years of disinvestment in strategic forces and are essential to both US and allied national security during the 1980s.

GENERAL PURPOSE FORCES (GPF): NAVY AND MARINE CORPS

US Navy and Marine Corps GPF programs have borne the heaviest burden of disinvestment in defense since the late 1960s. To pay for the modernization of the Navy in the late 1960s and early 1970s, Navy ships in commission were reduced by nearly 50 percent—500 ships—so that operation maintenance funds to support these ships could be diverted to the procurement of newer, though less numerous, more capable ships. High unanticipated rates of inflation in the early 1970s sharply reduced the ability of the Navy to procure the number of ships it intended to acquire to replace those decommissioned. The election of President Carter brought into power a new Administration far more skeptical of the fundamental role and mission of the Navy in US foreign policy. As a result, the number of ships to be built under the present Carter five-year shipbuilding plan, 97, represents a reduction of 60 ships from the Ford Administration's budget proposal three years earlier (i.e., 157 ships over five years). US ships in commission will fall to 350 by 1985 and to less than 250 by the end of the century, compared to nearly 1,000 in 1968. As a result, long-standing US foreign policy objectives in the Western Pacific, Eastern Mediterranean, and the Indian Ocean cannot be met.

The Soviet Military Threat to US Naval and Marine Forces

The evolution of Soviet naval power has proceeded in a steady, but unspectacular manner since 1956. The Soviet Navy has slowly turned from a small coastal defense force into a modern deep-water Navy capable of contesting the US Navy in many of its crucial areas of interest on a worldwide basis.

The growth of Soviet naval power has been facilitated by the nature of Soviet Third World diplomacy, which has provided them with a worldwide basing infrastructure capable of supporting the episodic deployment of Soviet naval power at crucial times. The "triangle" naval air bases on the Kola Penninsula (USSR), combined with Soviet bases in Angola and Cuba, give the Soviets a substantial long-range maritime surveillance capability. Moreover, these Soviet aircraft facilitate the positioning of "quick-look" satellites for the tracking of US naval vessels throughout the Atlantic.

The Soviets have made rapid advances in naval aviation, their most conspicuous realm of disadvantage against the US. The active Soviet shipbuilding program in surface vessels and attack sub-

marines now threatens the ability of the US Navy to perform its mission in many areas of the world. Soviet Naval Aviation units will receive half of the 400 Tu-22M *Backfire* bombers expected to be produced by 1985. These aircraft have a maritime attack role by delivering its on-board weapons (including a Mach 3 cruise missile), or by vectoring submarine-launched cruise missiles fired in salvoes against US carrier battle groups.

The Soviet Union is currently building the largest vessel constructed by any Navy (save for the US aircraft carrier program) since World War II: a 30,000 ton cruiser. Operating independently or in conjunction with a new generation of Soviet aircraft carriers (two of which, the *Kiev* and the *Minsk*, are already deployed) will significantly enhance the ability of the Soviet Union to project its naval power in remote areas of the world.

The Soviets have also deployed a revolutionary attack submarine, the *Alpha*-class. Made entirely of titanium (US submarines are made of steel), it can travel faster and operate at greater depths than US submarines. This submarine has sharply reduced the ability of the United States to detect, track, or successfully attack it.

The Soviet shipbuilding program, in contrast to the sharp oscillations of the US program, has been characterized by long-production runs, long retention in the Soviet force structure, the construction of new shipbuilding facilities, and multiclass production of ships that are rugged, specialized, and produced in large numbers.

US Navy and Marine Corps Forces

The US Navy faces major unfunded deficiencies in its current military requirements, including 24 cruisers/destroyers, 87 frigates, 10 attack submarines, and numerous amphibious and auxiliary craft. In addition, the annual US Navy aircraft procurement requirements of 160 to 200 aircraft per year has been seriously underfunded—only 61 aircraft were requested in the FY 1980 budget—leaving a vast cumulative deficiency in tactical aircraft for the US Navy and Marine Corps.

Simply meeting US Navy tactical aircraft requirements for the existing fleet of 12 aircraft carriers *alone* would require a three to four percent annual increase in Navy procurement for five years; far more than programmed in the current five-year defense plan, and infeasible within a five percent annual rate of growth in defense expenditure if other Navy deficiencies are to be met systematically. The severity of the shortage of aircraft is exemplified by

the DOD decision to eliminate the carrier-based S-3A antisubmarine warfare aircraft from carrier operations, converting it to the tanker, air cargo, and electronic warfare roles. Thus, to meet pressing fleet requirements for aerial refueling, air cargo, and electronic warfare aircraft, the antisubmarine protection of a carrier battle group will be placed at risk by elimination of a modern ASW aircraft.

The most capable mobile deployment force in the armed forces of any nation is the US Marine Corps. Yet, Marine requirements have been significantly underfunded since the late 1960s. Instead of investing in the appropriate modernization and the filling of deficiencies for the Marine Corps, the Administration has proposed the creation of a 100,000-man rapid deployment force without funding the necessary air- and sealift to support such an undertaking. As a result, the US will have two rapid deployment units in the force structure, neither adequately supported to perform the mission intended.

The cumulative effects of disinvestment in defense have taken a severe toll of the Navy and Marine Corps combat and support capability. Only a vigorous program of investment in procurement and R&D of 15 percent per annum for the duration of the forthcoming Five-Year Defense Program (FYDP) can mitigate the decade-long emasculation of the Navy/Marine Corps capability to meet nonnuclear war contingencies.

GENERAL PURPOSE FORCES: ARMY AND AIR FORCE

The FY 80 defense budget requested $50.0 billion for GPF for all services—a figure that accounts for only a portion of US GPF expenditure. Supporting expenditure is made for air- and sealift forces, guard and reserve forces, and related accounts. These expenditures combine to make GPF by far the most costly element of the US defense budget. The costs of developing, acquiring, and operating GPF are likely to remain at high levels because of the increasing costs of GPF relative to the benefits associated with marginal improvements in capability. Modest improvements, often crucial to combat effectiveness, can only be had at disproportionate increases in expenditure.

US GPF expenditure proposed by FY 80 is a modest reduction in effort from actual FY 79 expenditures of $50.3 billion in FY 80 dollars. The cut in GPF defense effort is difficult to reconcile with the Administration's rhetorical emphasis on NATO, where GPF re-

quirements dominate. If GPF expenditure were to meet the three percent growth objective President Carter established in May 1977, FY 80 GPF expenditure would have to be increased by $1.8 billion (to $51.8 billion) above the level requested.

The Soviet Military Threat to the US Army and Air Force GPF

Soviet military power has grown inexorably, but without the drama of a sudden surge of effort. No major dimension of Soviet military power has been overlooked.

The Soviet Union has increased its capability by means of additional manpower (troop strength has grown 4.0 to 4.8 million in less than a decade) as well as by the introduction of new equipment capable of greater performance. The structure of individual Soviet divisions has been strengthened by the addition of new tank, motorized rifle, and artillery battalions, and new divisions have been raised.

Low-performance tanks that represented an evolutionary development of the World War II era T-34 tank, the T-54/55, and the T-62 have been supplemented by a new tank—the T-72 built with advanced composite armor, modern range-finding and fire-control equipment, and a high performance smooth-bore gun. The T-72, now in serial production, will soon be supplemented with the T-80 now undergoing troop trials. Obsolescent wheeled and tracked armored personnel carriers have been largely replaced in assault units by a modern infantry fighting vehicle, the BMP. Vulnerable towed artillery is rapidly being replaced with a family of self-propelled artillery. Soviet tactical mobility, already of a higher order than US divisions, one-third of which are light unmechanized infantry divisions, is being further enhanced by the introduction of the Mi-24 *Hind* series transport/attack helicopter.

Short-range, low-payload Soviet tactical aircraft such as the MiG-21 are being replaced by a new series of long-range, heavy-payload aircraft capable of conducting deep-strike air-to-ground attacks throughout Western Europe. The expected deployment of 200 Tu-22M *Backfire* bombers with the Soviet Long-Range Air Army (an additional 200 *Backfire* bombers will be assigned to the Soviet Naval Aviation) will significantly augment the deep-strike capability of the Soviet Union's tactical airpower element, Frontal Aviation. The task of local air defense for Soviet ground forces is being absorbed by antiaircraft guns and surface-to-air missiles organic to all Soviet divisions.

A long-standing Soviet weakness—logistics—is being addressed

through a variety of measures including increased division-level logistics capacity, the forward deployment of fuel and ammunition stocks with Soviet forces, particularly in Eastern Europe, and the rapid introduction of materials handling equipment in the Soviet Army's logistics system. These measures serve to increase Soviet readiness, and reduce NATO warning time of an impending attack.

Soviet long-range theater nuclear forces have been augmented significantly with the introduction of the SS-20 and the Tu-22M *Backfire*, while three new shorter-range theater ballistic missiles (the SS-21, SS-22, and SS-23) have been introduced at the Soviet division, Army, and front level. The improvement of the Soviet theater nuclear force posture threatens the entire concept of deterrence in Europe where successful implementation of current policy relies on the credible employment of survivable theater systems. With more than 60 percent of US theater nuclear systems in weapons tied to delivery systems with a range of 15 kilometers or less, the United States possesses few weapons capable of holding Soviet long-range theater nuclear systems at risk, while the Soviets are able to threaten most US/NATO theater nuclear systems.

US Army and Air Force (GPF)

Sharply constrained by budgetary limits, the United States has been unable to deploy forces adequate to offset the cumulative impact of rapidly maturing Soviet modernization programs. The cumulative effect of underinvestment and disinvestment in GPF programs has resulted in a vast backlog of deficiencies in many components of US GPF.

US GPF expenditure in FY 80 has attempted to address some of the highest priority problems, particularly increasing the Army's combat capability for coping with the early stages of a conflict, improving US field air defense, sustaining combat operations, increasing the survivability of US command and control facilities, and reducing the vulnerability of US forces to chemical warfare. Priority attention for US tactical airpower has been focused on fully equipping all 26 US tactical air wings with their required complement of aircraft, modernizing Guard and Reserve aircraft, and improving electronic warfare and target, acquisition capabilities.

Two of the most pressing needs for US forces are to modernize US theater nuclear forces and to develop an adequate reserve system. At present, neither US theater nuclear forces nor the bulk of US reserves can contribute adequately to the ability of the United States to meet a major military contingency.

US theater nuclear forces are inadequate to meet the threat posed by the upgraded Soviet theater nuclear forces. The modernization of these forces will cost $3 to $5 billion, but are essential to the maintenance of deterrence in Europe. The forces as currently deployed have inadequate range to hold Soviet theater nuclear forces at risk, are too inaccurate for discriminate use, and are more destructive than is necessary or desirable. To correct these deficiencies, a family of new theater nuclear systems must be deployed, including ground-launched ballistic and cruise missiles, sea-based cruise missiles, and bombs for aircraft delivery.

Similarly, an overall reform of US military manpower policy must be undertaken to increase the number of entrants into the reserves while maintaining their combat proficiency, as well as reducing the overall costs of recruiting and retaining military personnel. All these objectives can be met by some form of conscription; reforms in the all-volunteer force could feasibly accomplish the same ends.

The cumulative deficiencies (e.g., in excess of $15 billion in ammunition for all services) and modernization requirements preclude meeting US near-term defense requirements within the modest real budget growth objectives (three to five percent) currently being discussed. Reducing deficiencies in critical items combined with an accelerated modernization schedule is central to a US military posture capable of deterring theater conflict (or supporting objectives should one come about). Reducing US military risk requires annual increase in R&D and procurement of 15 percent through FY 85.

EXPENDITURES SUPPORTING THE THREAT AND THE US RESPONSE

The US defense budget continues to be a major source of political controversy, despite the cumulative evidence of the relative growth of Soviet military power to that of the United States. There were long delays in completing Congressional action on the FY 80 defense authorization and appropriation bills. During the course of the past year, however, the debate has begun to focus on the magnitude of an expenditure increase rather than on the scope of reductions in defense effort.

Defense expenditure has a special property among Congressional and Executive branch decisions: defense requirements are determined by forces beyond national control. Thus, the appropriate measure for the required defense investment is whether or not the

forces procured enable the United States to cope in both a diplomatic and military sense with the military power of the Soviet Union. The resources provided to date have been insufficient to allow the deployment of forces adequate to US military needs.

Soviet Defense Expenditure

Soviet military capability is best measured by the forces they have deployed rather than the sums they invest in developing, procuring, and operating those forces. However, it is important to have reliable estimates of the magnitude of Soviet defense investment as well, both as a check on the total observed forces and as a measure of the Soviet commitment to their defense posture. For many years, this measurement was frustrated by a host of philosophical and empirical impediments to accurate estimation.

Estimation of Soviet defense expenditure is hobbled due to the Marxist character of the Soviet economy that does not permit a market price system in the Western sense, making measurement difficult, even with "perfect" data. The construction of the Soviet defense budget is vastly different from our own. Many accounts, routinely a part of the US defense budget, are excluded from the Soviet budget. An even larger number of accounts directly relevant to the Soviet's military posture are comingled with the expenditure of "civilian" Ministries.[3] Some of these difficulties reflect the Soviet preoccupation with secrecy about defense investment, but many others relate to fundamental differences between the Soviet and Western systems.

Empirical difficulties abound as well. The Soviet Union makes the acquisition of data on its military programs extremely difficult to acquire. This inevitably leads to incomplete information, requiring intelligence estimates about which there is likely to be a wide band of uncertainty. As the Soviet ruble is not an internationally traded currency, this makes conversion into dollar terms for purposes of international comparison a technically complex and inherently uncertain task.

In 1976, the Central Intelligence Agency (CIA) announced a series of revised estimates of Soviet defense expenditure based on new evidence. The search for new evidence was stimulated by the paradoxical observation made throughout the early 1970s that although the Soviets were buying and operating larger forces, their expenditures, according to the prevailing calculus, were declining. Such circumstances could occur only if there were a dramatic improvement in Soviet economic efficiency—an assumption for which

there was no evidence based on the declining performance of their civilian economy. The CIA effort produced new evidence on Soviet defense expenditure that required a major upward revision of Soviet defense expenditure estimates.

The new CIA estimates (in 1976) resulted in a doubling of estimated Soviet defense expenditure, the rate of growth of that expenditure, and of its percentage of the Soviet Gross National Product (GNP). The CIA estimate of Soviet defense expenditures in 1975 was raised from 27 billion to 50 to 55 billion rubles (excluding space-related programs). The rate of growth of Soviet expenditure was similarly revised from two percent per annum to four to five percent. Defense expenditures as a percentage of GNP was originally estimated to be less than five percent—comparable to the US figure. The revised estimates indicated that Soviet defense expenditure was 11 to 13 percent in 1975—comparable to the US effort at the Korean War peak in 1953.[4]

In the ensuing years, evidence has accumulated concerning the enormous effort the Soviets have made when measured in terms of defense expenditure. A recent RAND Corporation study has estimated that the Soviet Union has expended $100 billion more on defense programs since 1973 than the United States. Had the United States made such an effort, it would have permitted the procurement of 244 B-1 bombers, completion of the entire MX development and procurement program, procurement of all *Trident* submarines and missiles currently programmed, all 7,000 XM-1 tanks the US Army intends to procure, with an equal number of XM-2/XM-3 fighting vehicles, all of the F-14s, F-15s, F-16s, F/A-18s, A-10s, and the Advanced Medium STOL transport aircraft. Moreover, the growth rate of Soviet expenditure continues to exceed that of the United States, in both dollar and ruble terms.

The magnitude of the disparity in defense effort is dramatized by a calculation to ascertain how many years would be required to equalize Soviet-American defense expenditure at the rates proposed. Using the median ratio of Soviet-American defense expenditure in 1978 estimated by the CIA—1.5:1—and further assuming that President Carter agrees to increase US defense expenditure from his recommended rate of growth of three percent to five percent, 42 years will elapse (i.e., until the year 2022) before US defense expenditure will catch up to Soviet expenditure (four percent per year). This will not equalize cumulative defense investment—merely annual investment more than four decades hence. Making due allowances for the uncertainties inherent in the details

of the estimating process, the Soviet–American disparity in defense investment is now far too large to be accounted for by the technical measurement problems that clouded the debate for many years. The evidence about the scope and magnitude of the Soviet military program observed by the United States is simply reinforced by the evidence brought to the analysis of Soviet defense expenditure.

Now that the dimensions of the Soviet defense program are known, the determination of the Soviet leadership to build a very powerful military establishment can no longer be open to question. The prodigious Soviet effort contrasts sharply with the net disinvestment in US defense expenditure since 1964—the United States spends seven percent less in real terms on defense today than it did 15 years ago.

US Defense Expenditure

In the FY 75 defense budget submitted by Secretary of Defense James R. Schlesinger, the Ford Administration vowed to reverse the trend in declining defense investment in real terms. This posture was amplified by the Carter Administration in May 1977, when it committed the United States to increase defense expenditure by three percent per year in real terms. In both Administrations, spokesmen cited the increase in Soviet military power as the motive for such an increase. Despite more than four years of rhetorical commitment to increased defense expenditure, the United States continues to spend seven percent less today than it did 15 years ago, when the military threat was far smaller. The impact of inflation has been severely underestimated in Administration budget submissions since FY 78 and, as a consequence, defense expenditure has fallen below official estimates. Figure 1.1 shows several alternative bases from which defense expenditure can be compared. By each measure, there is a projected decline through 1984.

The budget recommendations made by the Congress in the FY 80 budget combined with the annual rate of inflation emerging at least five percentage points higher than originally estimated ensures that US defense expenditure will not only fail to meet the three percent goal—it will probably decline in real terms. The effects of the failure of defense investment to reach expectations has consequences beyond the FY 80 program. Major procurement items scheduled for acquisition cannot be procured. Of the 55 major programs reviewed in the DOD *Selected Acquisition Reports* (SAR), $114.3 billion remains to be authorized *if* the FY 80 budget is fully executed.[5] However, the Carter FY 80 FYDP plans for ag-

FIGURE 1.1
The Defense Budget, FY 1979-84, in Current and Constant Dollars
(In Billions of Dollars)

Budget Category	Fiscal Year 1979	1980	1981	1982	1983	1984	Total FY 1979-1984 Amt.	Average Annual Increase FY 1979-1984 Amt.	%
TOA (current dollars)									
1/78	126.2	137.2	148.2	160.5	172.7	186.8	931.8	12.2	9.7
1/79	125.7	135.5	145.7	155.7	166.8	177.7	907.1	10.4	8.3
Difference									
Amount	-0.3	-1.7	-2.9	-4.8	-5.9	-9.1	-24.7	-1.8	-1.4
Percent	-0.2	-1.2	-2.0	-3.0	-3.4	-4.9	-2.7		
TOA (FY 1980 dollars)									
1/78	133.5	137.2	141.1	145.9	151.1	158.2	867.0	4.9	3.7
1/79	133.2	135.5	138.4	141.5	145.9	150.5	845.0	3.5	2.6
Difference									
Amount	-0.3	-1.7	-2.7	-4.4	-5.2	-7.7	-22.0	-1.4	-1.1
Percent	-0.2	-1.2	-1.9	-3.0	-3.4	-4.9	-2.5		
Outlays (current dollars)									
1/78	115.2	125.8	136.5	147.9	159.5	172.6	857.5	11.5	10.0
1/79	111.9	122.7	133.7	144.9	155.5	165.7	834.5	10.8	9.6
Difference									
Amount	-3.3	-3.1	-2.8	-3.0	-4.0	-6.9	-23.1	-0.7	-0.4
Percent	-2.9	-2.5	-2.1	-2.0	-2.5	-4.0	-2.7		
Outlays (FY 1980 dollars)									
1/78	122.6	125.8	129.0	133.1	137.9	144.2	792.6	4.3	3.5
1/79	119.1	122.7	126.4	130.5	134.4	138.4	771.5	3.9	3.2
Difference									
Amount	-3.5	-3.1	-2.6	-2.6	-3.5	-5.8	-21.1	-0.4	-0.3
Percent	-2.9	-2.5	-2.0	-2.0	-2.5	-4.0	-2.7		

Note: Detail may not add to total because of rounding.

Source: The Budget of the U.S. Government and the Annual DoD Defense Report, FY 1980, and for appropriate fiscal years, reproduced in L.J. Korb, "The FY 1980-1984 Defense Program, Issues and Trends," AEI Foreign Policy and Defense Review, Vol. I, No.4 p. 28.

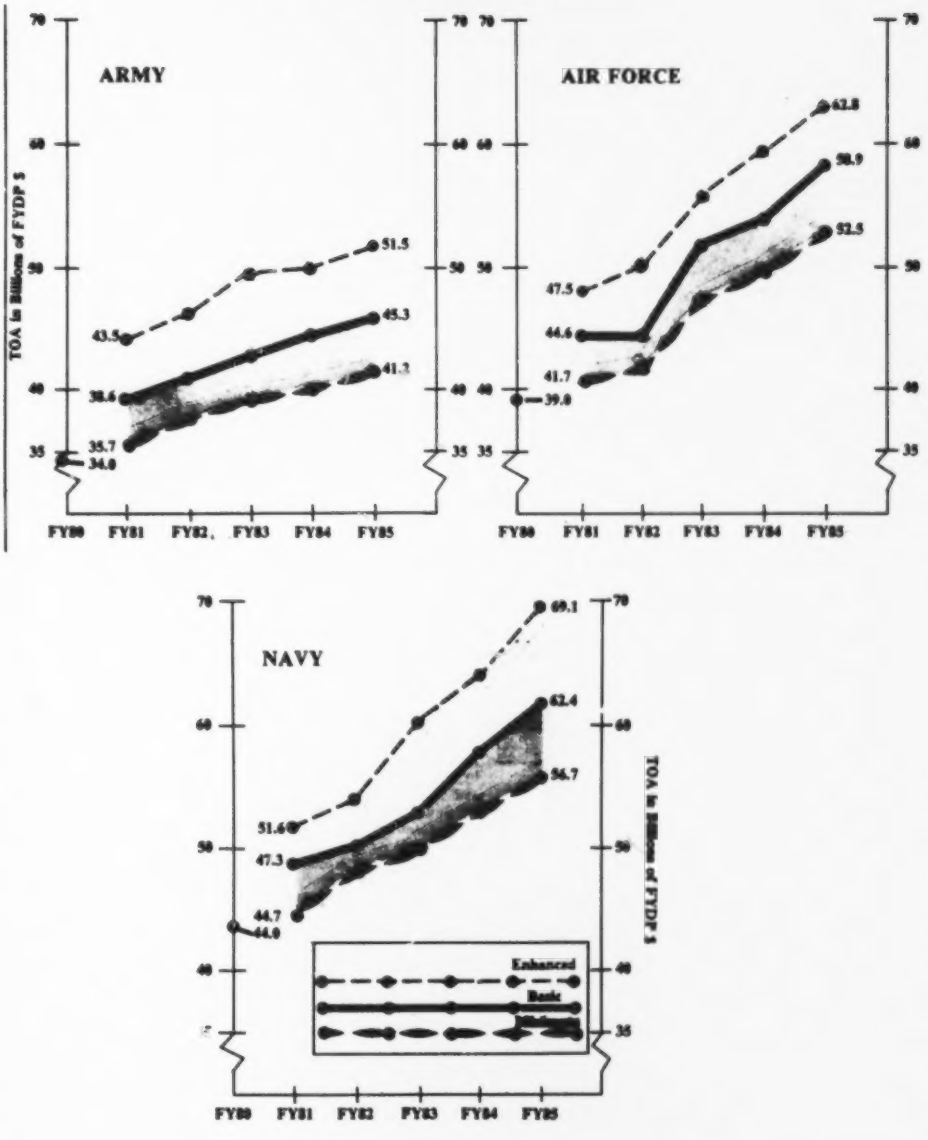
gregate defense budget growth of only $42.2 billion. Thus, DOD acquisition programs will have to be "stretched out" over a longer period of time, forcing procurement at uneconomic rates of production.

At this time of writing, preliminary indications suggest that the outlook for FY 81 is scarcely more encouraging. Of the three alternative budget proposals considered by the Administration, the most ambitious (the "enhanced" budget) would allow for only modest increases in expenditure.[6] However, President Carter's reluctance to permit major increases in defense expenditure virtually forecloses the prospect of closing the chasm between Soviet and American military power. Figure 1.2 displays the projected defense expenditure for the three services under the alternative budgets prepared by the Office of the Secretary of Defense.

The content of the proposed FY 81 budget reveals an acceleration of the trends of cumulative disinvestment in defense. Major programs are either cancelled or stretched out. Production termination decisions have been made for the F-15 and F-14A fighters as well as the KA-6H and EA-6B tanker and electronic warfare aircraft. Production cutbacks are proposed for the F-16 and the Army's UH-60A transport helicopter. The Navy's procurement budget will be reduced by $500 million. To fill the breech in tactical aircraft procurement for the US Air Force, the Secretary of Defense has recommended that four wings of F-5 aircraft be acquired. As this aircraft cannot operate at night or in adverse weather, it is likely to be of little value in the theater of operations where it is to be deployed, Europe. Yet the Secretary's recommendation is symptomatic of the diminishing ability of the United States to meet its military requirements within current and projected budget levels. Under the proposed FY 81–85 budget levels, less than one-third the number of new ships will be built for the Navy as recommended by the former Administration in January 1977. Such a shipbuilding program will not allow the resultant Navy force structure to meet existing commitments. This will eventually require withdrawal of planned patrols from the Western Pacific, the Indian Ocean, and/or the Eastern Mediterranean.

Budgetary decisions made to comply with the strictures imposed by the SALT (1979) will serve to divert defense expenditure from currently planned modernization programs. The decision to accommodate the design of the MX system to meet SALT verification requirements (as the President understands them) will increase the cost of the system at least $7 billion and perhaps as much as $12

FIGURE 1.2
Fiscal Year 1981-85 Budget Alternatives
(In Billions)



Source: B.F. Schemmer, Armed Forces Journal, September 1979, p.8.

billion. Similarly, the prohibition on the deployment of cruise missiles on aircraft other than heavy bombers or on surface ships will impose other higher-cost solutions that, in the absence of SALT, could have been accomplished at lower cost. If the SALT II Protocol is allowed to lapse in 1981, SALT II will result in only $10 to $12 billion in increased costs for the procurement of tactical forces. If the SALT II Protocol is extended, the additional costs imposed by SALT II for tactical forces will exceed $20 billion. These increased costs are imposed on tactical forces due to additional tactical aircraft (and their costly operation and maintenance) necessitated by the inability to deploy cruise missiles on tactical aircraft and surface ships (prohibited by the SALT II Treaty) and range/payload limitations imposed by the Protocol.

As a result of more than 15 years of neglect, the United States faces the consequences of permitting the Soviets to double their investment in defense while the US effort was allowed to decline. The cumulative effect of these events is a very large budget shortfall—too much to be made up for in a brief spurt of effort. The shortfall involving tens of billions of dollars can only be reduced by a determined effort over a period of years—as a practical matter, at least five years or more.

NOTES

1. Francis P. Hoeber and William Schneider, Jr., eds., *Arms, Men, and Military Budgets, Issues for Fiscal Year 1977* (New York: Crane, Russak, 1976).
2. At the time of writing, the SALT II Treaty is being considered by the Senate.
3. For example, most Soviet military production is carried out in the Ministry of Machine Building and Metal Working.
4. The problems of estimating Soviet expenditures, and the reasons for the intelligence failures that led to the drastic 1976 revisions were discussed at length by W. T. Lee in earlier issues of *Arms, Men, and Military Budgets, Issues for Fiscal Year 1977* and *Issues for Fiscal Year 1978*, respectively (Chapter 7).
5. The current estimate for FY 80 for 13 Army, 27 Navy/Marine Corps, and 15 Air Force major acquisition programs in the SAR is $210.4 billion, of which only $96.1 billion has been authorized through FY 79.
6. The three budget levels are the "minimum," "basic," and "enhanced," corresponding to low, medium, and high rates of growth.

2.

Strategic Forces

Francis P. Hoeber

INTRODUCTION

The SALT II Treaty, before the Senate for approval or disapproval of ratification as this is written, proposes to codify Soviet strategic superiority in the early 1980s, as SALT I codified parity (and left the road to Soviet superiority open). The probability, and increasing inevitability, of this strategic superiority has been the focus of concern of this chapter of *Arms, Men, and Military Budgets* since the series first appeared in early 1976.

Indeed, in 1979 the Administration admitted for the first time that, starting in 1980, the Soviet strategic forces would be larger than those of the United States, whether evaluated pre-attack, after a Soviet counterforce first strike, or after US counterforce retaliation (see Figure 1). It was added, however, that the balance will be restored in the late 1980s (*after* the Treaty expires at the end of 1985), primarily because of the planned deployment of the MX, plus completion of the programs for deployment of cruise missiles on B-52Gs and *Trident I* missiles on *Poseidon* and *Trident* submarines.

Thus, the Administration argues that the period of Soviet strategic superiority, which "might or might not be meaningful," will

exist for only a brief "window in time." It will be argued herein that this metaphor is not appropriate. The window will be closed only on the assumption of successful completion of the projected US programs and the failure of new Soviet programs to offset them, whether because of SALT limitations, a failing Soviet economy, or other factors.

On the contrary, present prospects are for an open-ended period of Soviet superiority. The only "window in time" that appears likely is the rapidly narrowing period during which the United States can still undertake new programs to offset the impending Soviet advantage. When the last issue of this volume appeared, in early 1978, it seemed highly unlikely that such programs would be enacted unless and until some major event altered attitudes, primarily within the Administration but also in Congress and the public. As this is written, such an event may be unfolding in the form of the SALT II debate itself. Meanwhile, the time remaining for US action has grown much shorter.

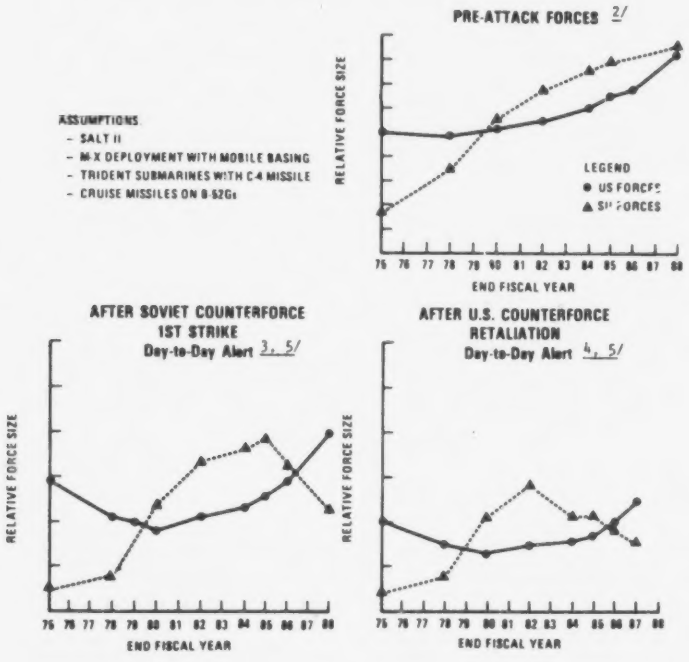
This chapter will discuss the strategic balance as it appears to be evolving, the effects of SALT negotiations and potential ratification of the SALT II Treaty on this balance, the potential effects of Soviet strategic superiority, and what the United States may still do to alter the trends.

THE DOD APPRAISAL OF THE STRATEGIC BALANCE IN THE 1980s

The above-mentioned Administration recognition of the relative advantage of Soviet strategic forces in the early 1980s is shown in Figure 2.1. While the charts have been "sanitized" of any actual numbers, their shape is frightening. Indeed, the curves are more disturbing when they are compared to those published a year earlier, reproduced in Figure 2.2 The latter curves did not include the reassuring closing of the "window" in the late 1980s, but they did assert that the United States could restore a marginally favorable US balance by counterforce retaliation throughout the period. The FY 80 report did not explain why the situation had changed so radically, at least on paper. Nor has the report been amplified since it appeared, despite public challenge.[1] Presumably, the January 1978 projections for the Soviets had been underestimated, as has been the pattern in the past, and some US programs slipped further during the year.

Unfortunately, even the pessimistic graphs in Figure 2.1 grossly

FIGURE 2.1
US and Soviet Strategic Forces Comparison[1]


PRE-ATTACK FORCES 2/
ASSUMPTIONS
- SALT II
- M-X DEPLOYMENT WITH MOBILE BASING
- TRIDENT SUBMARINES WITH C-4 MISSILE
- CRUISE MISSILES ON B-52Gs
RELATIVE FORCE SIZE
LEGEND
US FORCES
SOVIET FORCES
75 76 77 78 79 80 81 82 83 84 85 86 87 88
END FISCAL YEAR
AFTER SOVIET COUNTERFORCE 1ST STRIKE
Day-to-Day Alert 3, 5/
AFTER U.S. COUNTERFORCE RETALIATION
Day-to-Day Alert 4, 5/
RELATIVE FORCE SIZE
75 76 77 78 79 80 81 82 83 84 85 86 87 88
END FISCAL YEAR

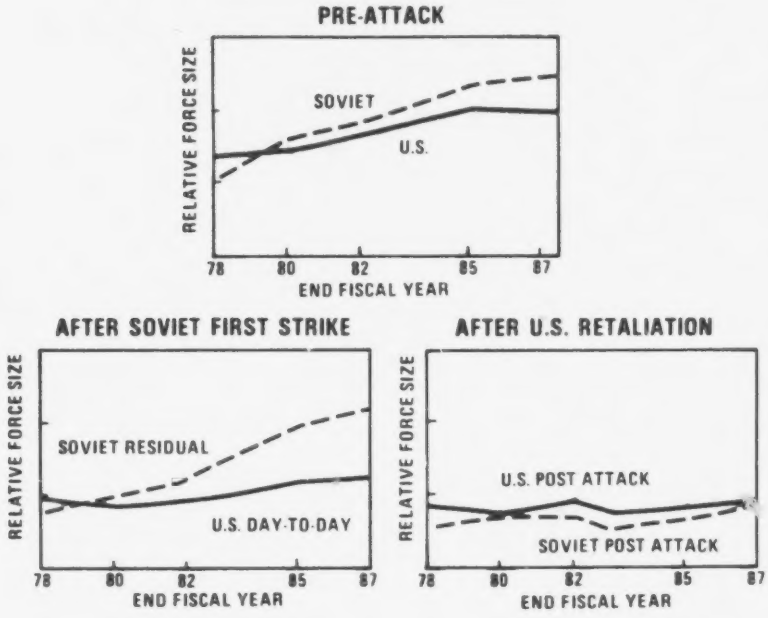
Note: These charts reflect only one of several ways to compare forces, although they are more comprehensive than most. They do not reflect the basis on which we plan to use the forces. As is the case with all multi-year force comparisons involving different forces, they do not take into account certain operational refinements on each side such as capabilities of and allowances for theater purposes, range limitations, and uncertainties associated with command and control. It should be emphasized that the data on Soviet forces beyond 1979 are subject to considerable uncertainty, being projections.

1/ Relative force size is a measure of capability to destroy a given set of military and economic targets.
2/ These curves represent the forces on each side that could be generated (not counting units in overhaul, repair, conversion, or storage).
3/ These curves show U.S. day-to-day alert forces that have survived a counterforce attack, and Soviet residual day-to-day alert forces. If the U.S. forces had been on a generated alert prior to the attack the number of U.S. forces surviving would be higher.
4/ These curves show U.S. day-to-day alert forces that remain after a U.S. counterforce retaliation. Soviet forces include surviving ICBMs, on-station SLBMs, any alert bombers, and those SLBMs and bombers that the Soviets had been able to generate after their first-strike. If the U.S. forces had been on a generated alert, the number of U.S. forces remaining after this retaliation would be higher.
5/ Both sides would remain capable of attacking a comprehensive list of "soft" military and non-military targets at this point. For this reason, the hypothetical differences between these forces might or might not be meaningful.

Department of Defense Annual Report for the Fiscal Year 1980, page 115.

understate the Soviet advantage for a number of reasons. The measure used, "relative force size" (already abbreviated to RFS in Washington argot), is defined (Note 1, Figure 2.1) as "a measure of capability to destroy a given set of military and economic targets." A careful reading reveals the startling fact that "a given set" is singular. The forces of each side were exercised against the same

FIGURE 2.2
US and Soviet Strategic Forces Comparison
(Day-to-Day Alert)



Note: Relative force size is a measure of force capability to destroy a given set of economic and military targets. The charts are based on U.S. day-to-day alert forces. Soviet "pre-attack" forces are those on day-to-day alert; Soviet residual forces after a first-strike are those which could be generated; and Soviet post-attack forces assume that the same Soviet bombers and SLBMs could be generated prior to U.S. counterforce retaliation. When both sides are on a generated alert, or when the U.S. strikes first, the relative force size measure is more favorable to the United States than shown in these charts.

Department of Defense Annual Report for the Fiscal Year 1979, page 104.

set of targets! The calculations do not compare the capabilities of US forces against Soviet targets with those of Soviet forces against US targets. But this is precisely how the forces of each side would threaten the other in real-world crisis and how they would perforce be targeted in the less likely but horrifying event of failure of deterrence. To pretend otherwise is an analytical trick, a game

played as though a potential nuclear exchange were a skeet shoot, carefully refereed to see that each player had the same number of chances to score against standard targets.

In reality, the numbers, distribution, concealment, and "hardness" (resistance to nuclear damage) of the potential targets on the two sides vary widely. It is known, for example, that the Soviet military targets are more numerous, more dispersed, and in many cases much more hardened than the corresponding US targets. Economic targets may be more numerous in the United States, but are more dispersed and more frequently concealed or disguised and hardened in the Soviet Union. If leadership were a target, which is does not appear to be in the DOD analysis, it would have to be noted that in crises the Soviet leadership, from the Politburo down to local officials and party leaders, and even the management of large plants, will be protected in hardened shelters of unknown location, whereas there are few shelters for US leadership, and their locations are well known.

The use of the strange methodology of creating all targets equal should be enough to discredit the official DOD figures.[2] However, there are other defects as well. Apparently the 1979 analysis in Figure 2.1 assumed that all US programs (MX, cruise missiles, and Trident) will be completed on schedule and will be as effective as predicted but that no new Soviet programs will be introduced to counter them, even though a new generation of Soviet missiles and strategic bombers has been announced.[3] It omits the Soviet Backfire (and older Badger) bombers, of which more below. And it takes no account of the effect of defenses on the "capability to destroy a given set of military and economic targets," of which a great deal more below.

AN ALTERNATIVE VIEW OF THE STRATEGIC BALANCE

Force and Counterforce

Table 2.1 shows the US/Soviet balance of strategic offensive forces in 1982 and 1985, by several measures:

1. The number of strategic nuclear launch vehicles (missile launchers and heavy bombers—the principal items limited, and presumed verifiable, under SALT II).
2. The total megatonnage (millions of tons of nuclear yield) carried by these vehicles.
3. The numbers of warheads on which this megatonnage is di-

TABLE 2.1
US and Soviet Strategic Offensive Forces in 1982 and 1985

A. Number of Strategic Nuclear Launch Vehicles (SNLVs)

	1982		1985	
	U.S.	U.S.S.R.	U.S.	U.S.S.R.
ICBMs				
- MIRV	550	820	536	820
- Non-MIRV	504	390	504	360
Total	1,054	1,210	1,040	1,180
SLBMs				
- MIRV	640	296	664	356
- Non-MIRV	160	680	80	620
Total	800	976	744	976
Heavy Bombers				
- Non-ALCM	331	64*	226	90*
- ALCM Carriers	15	0	120	0
Total	346	64	346	90
TOTAL STRATEGIC NUCLEAR LAUNCH VEHICLES	2,200	2,250	2,130	2,246

B. The Balance in Total Megatonnage

	U.S.	U.S.S.R.	U.S.	U.S.S.R.
ICBMs				
- MIRV	430	4,314	423	4,314
- Non-MIRV	1,026	1,935	1,026	4,590
Total	1,456	6,249	1,449	8,904
SLBMs				
- MIRV	364	582	383	750
- Non-MIRV	105	777	80	796
Total	469	1,359	464	1,546
Heavy Bombers (ALCMs, SRAMs, Gravity Bombs)	1,624	260	1,624	420
TOTAL MEGATONNAGE	3,550	7,868	3,537	10,870

*Excludes Backfires and Badgers.

vided (reflecting for the ICBMs the vastly larger warhead yields of the Soviet warheads).

4. The hard-target kill capability of these warheads.

For both 1982 and 1985, it is also assumed that the United States deploys all its permitted cruise missiles (3,360).

The significant point in this table is the high prompt-kill capability (Part D) of the Soviet ICBMs, especially in the 308 SS-18s.

TABLE 2.1 (continued)

C. Number of Warheads

	1982		1985	
	U.S.	U.S.S.R.	U.S.	U.S.S.R.
ICBMs				
- MIRV	1,650	5,752	1,608	5,752
- Non-MIRV	504	970	504	480
Total	2,154	6,722	2,112	6,232
SLBMs				
- MIRV	5,456	2,912	5,648	3,752
- Non-MIRV	480	1,080	240	1,324
Total	5,936	3,992	5,888	5,076
Heavy Bombers (ALCMs, SRAMs, Gravity Bombs)				
Total	2,824	260	4,504	420
TOTAL WARHEADS	10,914	10,974	12,504	11,782

D. Hard Target Kill Capability (CMP)**

	U.S.	U.S.S.R.	U.S.	U.S.S.R.
ICBMs				
- MIRV	46,175	211,169	45,279	211,169
- Non-MIRV	13,188	29,170	13,188	126,912
Total (Prompt CMP)	59,364	240,340	58,467	338,082
SLBMs				
- MIRV	14,059	13,871	14,723	18,469
- Non-MIRV	697	2,702	348	2,254
Total (Prompt CMP)	14,757	16,574	15,072	20,724
Heavy Bombers (ALCMs, SRAMs, Gravity Bombs) (Delayed CMP)	158,729	8,000	229,112	33,000
TOTAL HARD TARGET KILL CAPABILITY	232,851	264,914	302,652	391,806

* Excludes Backfires and Badgers

** CMP = (Counter Military Potential) = $\frac{nY^{2/3}}{(CEP)^2}$, where n = number of weapons, Y = yield in megatons, CEP = circular error probable (radius of circle in which 50% of weapons are expected to hit).

Source: Based on testimony of Paul Nitze, Sept. 11, 1979, Senate Foreign Relations Comm.

With ten warheads of about three-quarter-megaton yield and an accuracy (CEP) expected to reach 0.1 nautical miles (600 feet),[4] one-third to one-half of these missiles could destroy 90 percent of the US ICBM forces in 1982. A few more Soviet missiles could destroy the one-quarter to one-half of all US SLBMs in port (depending on alert status), plus many essential command-control facilities. A few Soviet submarines could kill all US bombers not on strip alert, and probably some of the 30 percent or less on strip

TABLE 2.2
US and Soviet Strategic Offensive Forces Remaining After Soviet First Strike

Number of Launch Vehicles	1982		1985	
	U.S.	U.S.S.R	U.S.	U.S.S.R.
ICBMs				
- MIRV	55	600-690	54	600-690
- Non-MIRV	50	390	50	360
SLBMs				
- MIRV	320-480	168-232	332-498	228-292
- Non-MIRV	80-120	680	40-60	620
Heavy Bombers	80-100	64*	80-100	90*
TOTAL VEHICLES	585-805	1902-2056	556-762	1898-2052

* Excludes Backfires and Badgers.

4. Tests demonstrating a 0.1 nautical mile CEP capability for both the SS-18 and SS-19 were reported by Aviation Week and Space Technology, April 3, 1978, p. 14.

alert under current rules. The remaining balance could be roughly as shown in Table 2.2.

The bulk of the surviving US forces are the SLBMs. These weapons have low yields and low accuracy (and at this point in the scenario, probably also degraded command and control). They could be useful against soft targets only—largely in cities. Moreover, all the decimated forces, especially the bombers, would face formidable Soviet defenses, as described in the next section, so that even limited replies against hard and soft counterforce targets would be deterred and infeasible. Surely a US second strike against Soviet cities would be deterred by the preponderant remaining Soviet forces, which could deliver a third strike against US cities while retaining overwhelming reserves for virtual control of the postexchange world.

The Role of Defenses

Thus far, the above comparison has focused on the Strategic Offensive Forces (SOF)—the ICBMs, the SLBMs, and the heavy bombers. Bad as the picture looks in these terms, it is much worse when Strategic Defensive Forces (SDF) and GPF are included. Asymmetries in the SDF are overwhelming.

In defense against ballistic missiles, the Antiballistic Missile (ABM) Treaty creates nominal equality. The 1972 Treaty permitted each side two defensive sites with 100 interceptor missiles each. The 1974 Protocol reduced this to one site. In 1975, the United

States unilaterally dismantled its one permitted site; the Soviets still have theirs around Moscow. More importantly, Soviet ABM R&D greatly exceeds that of the United States and there is a real possibility of a Soviet breakout from the Treaty sometime in the 1980s, on a time scale to which the United States could not respond.

After the signing and ratification of the ABM Treaty, the United States dismantled its once-significant air defenses, on the argument that they were irrelevant if we were vulnerable to the missile threat. But the Soviet Union continued to modernize its vast air defense system. It may also be noted that since the fall of Iran, the likelihood is high that the Soviets have acquired the training and maintenance manuals for the F-14/Phoenix missile system, with its high technology "look-down shoot-down" capability, and quite possibly one or more F-14s as well; these acquisitions can give the Soviets a quantum leap in the major air defense technology in which they have appeared to lag seriously behind the United States, namely that of look-down shoot-down capability to (1) direct radars towards the sea or the earth and acquire and track low-flying aircraft or missiles, while adequately rejecting clutter reflected from the surface of the globe and (2) accurately fire air-to-air missiles that can hit such targets.

The civil defense asymmetry is well known, the Soviets having a large and long-standing civil defense program and the United States virtually none. Secretary Brown floated a trial balloon last year for the initiation of a US city evacuation plan, but that trial balloon has been permitted to float quietly away. Soviet civil defense is now countered with assertions that it won't work, when the issue is really whether the possibility it may work even partially will affect bargaining power in crisis. Surely it will be expected to degrade our "Assured Retaliation" capability.

In the realm of antisatellite defense (ASAT), the Soviets have operational systems capable of knocking out a crucial portion of our space-borne eyes and ears in a crisis or at the outset of nuclear conflict. The United States has belatedly started a small R&D program to meet this threat, with no acknowledgment of the fact that we abandoned such a program in 1963 as not having a military mission (sic).[5] Sadly, the US program of the early 1960s utilized a better approach than that of the Soviets today, namely, the so-called direct ascent use of ABM-type interceptor missiles as against the Soviet launching of satellites into quasicoorbit with the satellites to be attacked and depending on orbital adjustment for

closure to kill. The latter approach is much slower, permitting the possibility of countermeasures, and less efficient in terms of the amount of booster power required.

The Soviet ASAT capability is effective, to date, against low-orbit satellites only, not against "stationary" satellites in 22,000-mile-high orbits. We cannot know, however, whether the Soviets have deployed or will deploy high-altitude nuclear "space mines" that could take out our stationary-orbit satellites in the first moments of a war. (They could even do this by detonation at the "conjugate point" 180° away, on the other side of the earth.) Such mines would violate the Treaty on Outer Space, but that treaty is not verifiable. Their use might also blind Soviet stationary satellites, but the Soviets are less dependent than the United States on such satellites and, with the initiative, the Soviets could plan to replace their satellites whereas we are not prepared to do so promptly and in any event their loss at the outset of a nuclear attack would seriously degrade our warning time and battle management.

In short, while SALT I, the Vladivostok Accords, and SALT II have limited Strategic Offensive Forces (more severely for the United States),[6] defenses, except for ABM, have been unlimited. The Soviets have never flagged in their two-decade build-up of strategic defenses. Building defenses against fixed known offensive forces can be highly effective.

The United States, in contrast, has largely abjured strategic defenses, in the belief that survival in nuclear war is infeasible[7] and consistently with the mutual-hostage aspect of the doctrine of Mutual Assured Destruction (MAD), or deterrence-only. The inconsistency is suicidal: defenses introduce uncertainty for the offense; an offense unopposed by defenses is virtually assured of achieving its objectives. Thus, for the United States, there can be no assurance of "Assured Destruction" or "Assured Retaliation"; for the Soviets, there is high assurance of destruction of their targets (in general, nuclear and other military forces, command-control, and military-support industries—there is no evidence of Soviet targeting of population and industry per se). The difference must be perceived by both sides and by third parties when strategic threats are implied or articulated. In other words, the defense asymmetry will contribute to potential Soviet crisis control and diplomatic coercion, and to weakening of US alliances.

The Relation of Strategic to General Purpose Forces

With regard to the nonstrategic, or GPF—the subject of Chapters 3 and 4—there has long been no disputing the overwhelming Soviet superiority in land forces: men, tanks, artillery, interior lines of communication, and so on. In recent years, it has also become clear that they have greater numbers and are catching up in the equality of tactical aircraft. They are also catching up with the once-overwhelming US naval superiority. Today, the Soviets have more major combat ships than the United States in every category except aircraft carriers.

The United States has lived with Soviet conventional superiority, especially in the key European theater, since the post-World War II demobilization of the US expeditionary force and sharp decline in the US defense budget. We could tolerate this situation because we had the so-called nuclear umbrella, at first a monopoly, and then, throughout the 1950s and most of the 1960s, marked superiority. But as that superiority and even parity vanished, the Administration has belatedly recognized the consequent renewed importance of GPF. This recognition is reflected in the 1977 US-led NATO commitment to a three percent annual increase in real defense expenditures. Never mind that it is difficult to understand how such expenditures will catch up with the Soviet Union, which is still increasing real expenditures, by official estimates, at four to five percent per year,[8] despite Secretary Brown's metaphor of ". . . . the right regimen for the long distance runner."[9] The three percent increase is not being met by the United States in any event, because of inflation.

The Soviets, however, never lost sight of the importance of conventional forces, and of the interface with nonconventional forces. They have, for example, an extensive program to train and equip their personnel for duty in both a nuclear battlefield and a chemical or bacteriological environment. The United States has no comparable program. This is just one of the many aspects of preparedness in which the United States has been negligent and the Soviet Union attentive.

We are not suggesting, however, that if the strategic balance were to be redressed the United States could afford to return to a *policy* of inferiority in land forces or to accept the current trend toward inferiority in sea forces. The reason lies in the Soviet doctrine for nuclear war. When parity made nuclear war really thinkable (and the Soviets quite sensibly have viewed parity as

increasing the risk of war between equals, not as creating "stability" in accordance with American theory), the Soviets began to think seriously of nuclear weapons as part of their "combined arms" concept of war fighting.

Strategic nuclear war is hardly "thinkable" outside of the context of a crisis over conflicting vital national interests. Such a crisis might, indeed, arise out of conventional conflict in one or more theaters, say, Europe or the Middle East. But if the conflict starts with a nuclear strike, it probably will also "go conventional"; the Soviets would hardly initiate a nuclear counterforce attack (as in most American scenarios) without protecting their vulnerable flanks, moving land forces out towards Europe, the Middle East, and China. This would also be a way of protecting their forces by "dispersing forward." They would probably also attack our aircraft carriers and perhaps other ships.

One must also assume that the Soviets would want to take the naval initiative. Surviving naval forces will not only have a strong bearing on the outcome of theater conflicts but would also have a large, possibly dominant role in recovery from nuclear war: superior surviving Soviet naval forces could deny external trade and aid to the United States and also prevent US interference with Soviet access to resources in Western Europe and Japan. We can no longer afford to think in terms of simple strategic nuclear exchange models.

SALT II

It was noted in the introduction that the long-observed deterioration in the US military position and the approaching Soviet strategic superiority discussed above was not likely to be reversed without the occurrence of some "event" that would alter US Administration and Congressional thinking, as well as public support. This event, it was suggested, might be upon us in the form of the debate over SALT II.* We pause now to describe briefly how that Treaty came about, what it provides, and what it does not provide.

America's self-inflicted wounds started with the insistence by McNamara in the 1960s that the Soviets had "given up the quantitative race with the United States" and that they would stop building when they caught up with us, establishing a stable state of "Mutual Assured Destruction" (MAD). Throughout the 1960s

* Since this was written, the "event" has, of course, been the two events of the Iran hostages and the Soviet invasion of Afghanistan.

and 1970s a series of underestimated "National Intelligence Estimates" (NIEs) were produced to rationalize this position. Not only were further quantitative increases in strategic systems abjured in this country, but qualitative improvements were postponed as well, especially in the realm of increased accuracy, which might seem to threaten a "destabilizing" first strike capability.

With the signing of the ABM Treaty in 1972, alleged to confirm Soviet acceptance of MAD and its underlying mutual-hostage assumption, strategic defenses were also abandoned by the United States, despite palpable Soviet emphasis on such defenses.

The trend toward Soviet superiority was accelerated in the late 1970s by a series of Administration decisions to cut US strategic programs unilaterally, without waiting on or attempting arms control bargaining: cancellation of B-1 procurement; delay in the cruise missile, MX and Trident programs; closing of the Minuteman III production line; and rejection of the neutron bomb.

Nevertheless, the SALT II Treaty is defended as slowing the arms race. If the Minuteman force is vulnerable to Soviet attack in the early 1980s, the new MX (Missile Experimental) just put into full development, may restore the survivability of the ICBM force in the period 1986–1990—but this is after the Treaty expires and thus does not consider the possibility that the United States, bargaining from a position of inferiority during SALT II, may not be permitted to deploy MX. With the ICBM force in jeopardy and the bomber force rapidly aging, we may effectively be abandoning the historic Triad of strategic forces for a Monad.[10] We would then be relying on a submarine-launched ballistic missile (SLBM) force consisting primarily of the Poseidons, with a capability for soft-target spasm response only, until the full deployment of the Trident systems—now behind schedule, with the potentially more accurate Trident II missiles not even in advanced development. This is the discredited and unusable Assured-Destruction-Only doctrine, recently epitomized in President Carter's inaccurate statement that "just one of our relatively invulnerable Poseidon submarines . . . carries enough warheads to destroy every large- and medium-sized city in the Soviet Union." [11]

The Limits on Launchers

The first limit imposed by the Treaty is that of 2,400 strategic launchers, as first agreed in the 1974 Vladivostok Guidelines. Strategic launchers are defined as ICBM launchers, SLBM launchers, heavy bombers (see below), and ASBMs (air-to-surface ballistic missiles). This limit is to be reduced to 2,250 by January 1, 1981.

The first problem to be noted here is that, in limiting launchers, the Treaty says nothing about numbers of ballistic missiles—and warheads—that may be built. Both sides build more missiles than launchers, in order to have missiles available for operational testing and training. The building of additional fixed launchers is prohibited, as is the storing of additional missiles "at launch sites of ICBM launchers," in order to prevent "quick reload," i.e., reload and firing before an empty silo could be destroyed by a slow means such as a bomber or air-launched cruise missile (ALCM). However, the risk is that extra missiles might be launched from "soft launchers" (erectors), e.g., inside of factories or storage buildings (the roof being slid or blown off), or even without any launcher by floating and launching from water (which has been tested).

Launchers are not counted unless they are: operational; in the final stage of construction; in reserve, in storage, or mothballed (presumably, aircraft or submarines); or undergoing overhaul, repair, modernization, or conversion.[12] Most significantly, "in the final stage of construction" means SLBM launchers on submarines that have begun sea trials and aircraft or other strategic offensive arms that are finally assembled in a plant or other facility, after they have been brought out of the facility where their final assembly has been performed. Thus, if, in the above case, the missiles on soft launchers had not been moved to another building after final assembly, then they would not be in violation of the Treaty. At most, the observation of large plants with supplies going in and no final product coming out might raise questions in the minds of US intelligence analysts, but they might not be an adequate basis for a challenge under the Treaty—and a challenge might not be effective.

Moreover, it must be observed that the risk of such avoidance rather than evasion (as the terms are distinguished in, say, tax law) would hardly be symmetrical for the two signatories. The United States could scarcely conceal the building of significant numbers of additional missiles, let alone indoor launchers, whereas this might quite conceivably be done in the closed Soviet society. In addition, the United States has closed down its Minuteman III production line and would not be in position to respond if such a Soviet program were discovered or disclosed as a "breakout" by the Soviets. Neither MX nor Trident II will be on-line during the life of the Treaty. Trident I missiles are already committed to replacement of Poseidon missiles and placement on the new Ohio Class (Trident) submarines in the 1980s; if they could be adapted to

launch from land launchers, the process, and a significant increase in their rate of production, including additional warheads, would take considerable time.

A second problem is that the launcher limit gives more the appearance than the reality of equity. It has been argued that it gives both sides equal numbers and moreover requires the Soviets but not the United States to reduce existing numbers, that is, to retire some old systems. However, it concedes to the Soviets, on a presumably permanent basis, an advantage in ICBM throwweight of between 4½ and 5 to 1. It was argued at the time of SALT I that an ICBM throwweight and megatonnage advantage for the Soviets was more than balanced by US MIRVs (multiple independently targetted reentry vehicles) as well as greater US accuracy and a larger bomber force (the latter not covered in SALT I). However, the Soviets started testing MIRVs in the first year under SALT I and are now deploying them. Moreover, by the early 1980s they will have accuracies equal to those of the United States. We will indicate below the magnitude of the advantage in warheads into which the Soviets will have converted their throwweight advantage by the expiration of the Treaty.

More than half of the Soviet throwweight advantage stems from their possession of 308 SS-18 launchers (326, including launchers at test sites), with a throwweight of about 16,000 pounds each and classified as modern large ballistic missiles (MLBMs), which we do not possess *and are not permitted to build under the Treaty*. An attempt was made in the "Comprehensive Proposal" put forward by the United States in March 1977 to roll back the Soviets to a limit of 150 MLBMs. This proposal was summarily rejected by the Soviets and was withdrawn in the May 1977 US proposal. It has been argued that "In practice, the United States has no interest in heavy missiles, so this apparent [sic] asymmetry is of little importance." [13] While it may be true that two decades ago the United States found it technologically suitable to build more small missiles rather than fewer large ones, this can hardly make "of little importance" the freezing of a large advantage in missile size while limiting the number of launchers. On the contrary, we have seen in Table 2.2, that the large Soviet ICBMs create instability and a usable margin of Soviet strategic superiority.

It is worth noting also that only 50 SS-18s—about 16 percent of the total number allowed, with ten warheads in the three-quarter megaton range—would carry more megatonnage than the entire present US Polaris/Poseidon SLBM force. Sixty SS-18s, or ten per-

cent of the force, would still exceed the US SLBM megatonnage in 1985, after the addition of Trident I in 12 Poseidon conversion and 7 Ohio-class submarines. Or, less than 70 SS-18s, will carry the megatonnage of the entire Minuteman III force in 1985.

The Sublimits on MIRVed Missile Launchers

Within the overall ceilings of 2,400, and then 2,250, the Treaty provides, again as a heritage of the 1974 Vladivostok Guidelines, a limit of 1,320 on the total number of MIRVed ICBM and SLBM launchers, and heavy bombers carrying cruise missiles. Of this number, not more than 1,200 can be launchers for MIRVed missiles (leaving 120 for cruise missile carriers, if either side so chooses). Within the 1,200 there is a further sublimit of 820 on launchers for MIRVed ICBMs. Let us consider the effect of each of these limits, in reverse order. We will focus on the 1985 endpoint, which means also on the 2,250 total limit.

The 820 MIRVed ICBM Launchers

"Counting Rules" in the Treaty require any booster of a type on which MIRVs have been tested be counted as a MIRVed booster, and any launcher of a type from which such a booster has been launched be construed as a launcher for MIRVed ballistic missiles. Thus, the 308 SS-18 silos will count toward the Soviet ceiling. An additional 512 can by 1985 be silos for SS-19 or SS-17s. They are expected to be predominantly SS-19s. The SS-18 has been tested with ten MIRVs,[14] the SS-19 with six, and the SS-17 with four. The 820 Soviet MIRVed ICBMs could carry, then, between 5,128 and 6,152 warheads, and probably will carry closer to the latter number.

The United States will have 550 Minuteman III missiles with three warheads each, or a total of 1,650 MIRVs. With the Minuteman III line closed down and MX procurement no longer feasible by 1985, 550 Minuteman IIIs are all the MIRVed ICBMs we will have deployed by the expiration of the Treaty. (Minuteman III has been tested with seven RVs—the "Pave Pepper" payload—and thus could be so deployed under the Treaty. There are no procurement plans for doing this, however, and doing so with smaller warheads—70 kilotons, vice 170 or about 300 when the new and more accurate Mark 12A is deployed to replace the present Mark 12 warhead—would not improve the hard-target kill capability of the missile. A "Common Understanding" in the Treaty says that the United States has no plans to and will not deploy more than three warheads.

The significance of MIRVed ICBMs is their prompt hard-target kill capability and their destabilizing potential for improving the strategic balance in a first strike. The entire Minuteman III force, in contrast, with MARK-12A warheads of the order of a third-of-a-megaton in power, could destroy only about two-thirds of the Soviet ICBM force, thus worsening, not improving our relative strategic position.

The Limit on MIRVed SLBMs

In theory, up to 1,200 launchers could be allocated by both sides to MIRVed SLBMs. In practice, of course, there will be a preference for allocating permitted launchers first to MIRVed ICBMs, as is implied by the establishment of the 820 MIRVed ICBM launcher sublimit. This preference stems from the greater accuracy (and feasible size, or yield) for ICBM MIRVs under the present state of the art, as well as the greater security and assurance of command, control, and communications for ICBMs than for SLBMs. We have already noted that the Soviets are likely during the life of the Treaty to deploy their full quota of 820 MIRVed ICBM launchers, including the 308 SS-18s, but that the United States does not plan, because of the closing of the Minuteman III production line and decision delays on the follow-on MX, to have any but the 550 Minuteman IIIs deployed under the life of the Treaty.

Thus, the Soviets can deploy up to 380 tubes for MIRVed SLBMs under the Treaty. These could be SS-N-8s, with 4,000-nautical-mile-plus range (comparable to the US Trident I, due to start on-line within a year) and up to 14 MIRVs, and SS-N-18s, smaller but already tested at 5,600-nautical-mile range (in the class of the Trident II, which the United States may deploy after 1985) and with up to 7 MIRVs. They can deploy these missiles on the present Delta submarines, carrying 16 each, and the larger Typhoon, in advanced development and expected to carry 20 to 24 missiles.

The United States already has 480 Poseidon SLBMs deployed, carrying 8 to 10 MIRVs each, with 40-kiloton warheads and a range of almost 2,500 nautical miles, plus 16 Trident I missiles in the first converted Poseidon boat. Twelve of the Poseidon boats are being backfitted with 16 Trident I missiles each between 1979 and 1985, with 7 MIRVs or 4,000 mile range and about 100-kiloton yield. In addition, the Trident I is scheduled to be deployed on seven Ohio-class boats carrying 24 each, an eighth submarine funded in the FY 80 budget. Thus, the United States may have some 664 SLBM launch tubes with up to 5,984 MIRVs, as against 380 Soviet tubes with between 2,660 and 5,320 MIRVs. However, 664 MIRVed

SLBMs plus 550 MIRVed Minuteman IIIs would total 1,214 MIRVed missiles, or 14 over the 1,200 limit. Therefore, unless the Trident program slips so that only six new boats are deployed by 1985, the United States would have to retire one Poseidon boat (16 launchers) or 14 Minuteman III launchers.

In any event, the United States would still have some advantage in numbers in the MIRVed SLBM category. However, with their small warheads and less accuracy than ICBM MIRVs, these weapons will not have sufficient hard-target kill capability. They are useful against soft targets only. These include airfields, but it should be noted that the Soviets have more, more dispersed, and deeper inland military airfields than the United States. The SLBM has long been considered the weapon of choice for a bomber base attack, because of its short flight time, particularly with the use of depressed trajectories (flying lower but faster, at shorter ranges, than with minimum energy trajectories). But this mission is of little interest to the United States, both because we are unlikely to plan a first strike and because of the greater depth of location (and therefore warning time) of the Soviet strategic bomber bases.

Non-MIRVed Ballistic Missile Launchers

There are no fixed limits on non-MIRVed ballistic missile launchers, since the difference of 1,050 between the 2,250 strategic nuclear delivery vehicle launcher limit and the 1,200 MIRVed missile sublimit can be utilized for missiles or bombers. However, we can make some first approximations of what can and is likely to happen by 1985.

First, consider single-warhead ICBMs. The Soviets are expected to dismantle over 200 SS-7s and SS-8s—old missiles of the Atlas generation that preceded the US Titan II and the Soviet SS-11—in order to reduce its total launchers to 2,250. They appear likely (after considering SLBM and bomber requirements) still to retain 300 to 400 non-MIRVed ICBMs. These could be SS-11s, with about 2,000-pound throwweight and megaton-range warheads. However, the Treaty permits each side to test and deploy one new ICBM. Moreover, each side will be limited to modern small ballistic missiles (MSBMs) and modern large ballistic missiles (MLBMs) no larger in throwweight than their present ones, i.e., about 8,000 and 16,000 respectively for the Soviets (based on SS-11s and SS-18s) and 8,000 pounds for the United States (based on Titan II, the United States having no MLBMs and therefore not being permitted any). Thus, the Soviets would have more to gain by using their option for one new ICBM to replace some of the SS-11s than one

of their newer MIRVed SS-18s, -19s, or -17s, still being deployed.

The Soviets have for several years been known to have a new generation of missiles in development (including component testing), deployable in the early 1980s. One of these could be a new 8,000-pound throwweight missile with a warhead in the 15 to 20 megaton range—a formidable weapon indeed with which to deter a US retaliatory city attack—or large-scale economic attack, which would amount to the same thing. The aggregate power of a force of 300 to 400 such weapons would be of the order of 4,500 to 8,000 megatons.

In point of fact, however, because of the modernization provisions discussed in the next section, the Soviets might be able to deploy four new ICBMs, beginning during the life of the Treaty, since they are known to have a whole new generation of missiles in advanced development.[15]

The United States can, during the period of the Treaty, deploy no new ICBM, as observed above, because of past unilateral decisions in delaying MX development. It will still have in 1985, therefore, all or most of the 450 Minuteman IIs of some 2,000-pound throwweight, with megaton-range warheads, and it may well choose to retain the 54 aging Titan IIs, of early 1960s vintage but carrying a warhead of 8+ megatons, or it may have to retire some of them. Thus, the United States could have 450 to 900 megatons on non-MIRVed ICBMs on launchers—some 10 or 11 percent of the Soviet force of this type.

The Soviet Union currently has 792 SLBM tubes deployed and is building several missile-carrying submarines a year. If, as suggested above, it MIRVs some 380, it could have perhaps 550 to 650 unMIRVed SLBM tubes in 1985. These could be single-RV or MRV (multiple, but not independently targetable, reentry vehicles, as on Polaris); the latter can be useful against soft targets, notably, bomber bases, which can be "pattern attacked" without using MIRVs.

The United States, on the other hand, will by 1985 have retired five of its ten currently deployed Polaris boats, each of which carries 16 SLBMs with three MRVs in the 200-kiloton yield class. This would mean no more than 80 unMIRVed SLBMs and 240 warheads, somewhat less than one-half the Soviet numbers and, in terms of at-sea force, a marginal addition to the unMIRVed ICBMs.

Missile Modernization

The Treaty expressly permits modernization or replacement of strategic offensive arms (launchers). The question is, "What con-

stitutes modernization?" This was loosely and ambiguously defined in SALT I in terms of an increase of "10 to 15 percent" in launcher dimensions (interpreted by the United States to refer to one dimension only—a 32 percent increase in volume if diameter were increased, but by the Soviets to refer to both dimensions, or 52 percent in volume). The new Treaty will permit a 32 percent increase in the internal volume of an ICBM silo.

But the Treaty introduces new criteria for what constitutes a new, rather than simply modernized ICBM. "New types of ICBMs," are agreed to include any that differ from those flight-tested as of May 1, 1979, in one or more of the following respects: "(a) the number of stages, the length, the largest diameter, the launch-weight, or the throw-weight, of the missile"; and "(b) the type of propellant (that is liquid or solid) of any of its stages." "Different" length, diameter, launch-weight or throwweight means a difference in excess of five percent. A further Common Understanding permits testing or deployment of missiles with fewer reentry vehicles, penetration aids, or both, *providing* that the quantity of propellant in all stages, including the dispensing mechanism (MIRV "bus"), is proportionately reduced. In short, "offloading" RVs or penetration aids is not to be used to permit increased range or depressed trajectories to the same range.

It is dubious whether national technical means of verification can detect variations in the stated characteristics with sufficient precision to make the distinction meaningful. Moreover, the "Data Base" accompanying the Treaty includes numbers of launchers only, not figures on the characteristics that are not to vary by more than five percent. In addition, while each side is limited to the flight testing and deployment of only one new type of light ICBM, the Soviets can deploy their above-noted full family of fifth-generation ICBMs, so long as the changes are asserted and/or observed to fall within the five percent limit. While it has been argued that this doesn't matter because a five percent difference is not significant, it is clear that the new missiles could include highly significant improvements in characteristics not covered, such as accuracy, reliability, yield-to-weight ratios, and possibly MIRV footprints. This is a significant potential asymmetry in the Treaty.

The Cruise Missile Limitation

One hundred twenty heavy bombers (1320–1200) will be permitted to carry an average of 28 long-range (over 600 kilometer)

air-launched cruise missiles. An agreed counting rule says that an aircraft is a heavy bomber if it carries a long-range cruise missile. Thus, if a wide-bodied transport should be adapted to a cruise missile carrier, it will be counted as a heavy bomber. The wide-bodied transport has always had serious drawbacks in its prelaunch and offshore vulnerabilities; the 28-cruise-missiles-per-heavy-bomber average limit probably drives it out of the cruise missile carrier competition altogether.

It has been pointed out, especially since the June 30, 1977 cancellation of the B-1 bomber procurement, that the United States has a considerable technological lead in cruise missile technology (in guidance technology and miniaturization and in the efficiency of small turbine engines). However, the Soviets have long deployed numerous types of short-range cruise missiles and have recently been reported to be testing cruise missiles of 1,200-kilometer range, launched from Backfires; thus this technological lead, like many others, may prove evanescent. In any event, its significance is limited. The stand-off advantage is worth more to the United States simply because the Soviets have formidable air defense deployments and the United States does not. The impressive accuracy of the cruise missile does give it a hard-target kill capability, but like that of the bomber-delivered gravity bomb, this is a slow, not prompt, kill capability and is subject to degradation by the Soviet air defenses.

Bombers

There is no limit per se on the numbers of bombers. Since they are, however, included under the total launcher limitations of 2,400 and 2,250, their ultimate deployments under the Treaty can be assumed to be 2,250, less the numbers of ICBM silos and SLBM launch tubes. From the numbers cited above, recapitulated in Table 2.3, the Soviets could have anywhere from 100 to 200 bombers and the United States from 452 to 500 in 1985. The permitted cruise missile carriers of up to 120 would be included in these numbers.

In the "Memorandum of Understanding . . . Regarding the Establishment of a Data Base on the Numbers of Strategic Offensive Arms," the Soviets gave their June 18, 1979 inventory of heavy bombers as 156; the United States, 573. However, while the Soviet bombers are aging Bears and Bisons, they have three new heavy bombers under development.[16] These include one with variable-geometry wings and characteristics similar to those of the B-1 and

TABLE 2.3
Launchers for Strategic Nuclear Delivery Vehicles Permitted and Feasible Under Salt II Treaty

	End of 1985	
	U.S.	U.S.S.R.
Launchers for		
MIRVed ICBMs	536-550	820
of which MLBMs (SS-18)	0	(308-326)
MIRVed SLBMs	650-664	380
Total MIRVed Missiles	1,200	1,200
UnMIRVed		
ICBMs	450-504	380-580
SLBMs	80	270-570
Total	530-584	850-950
Total Ballistic Missiles	1,730-1,784	2,050-2,150
Heavy Bombers		
With Cruise Missiles	120	0-120
Without Cruise Missiles	100-220	100-200*
Total	220-340	100-200*
Total MIRVed Launchers and Cruise Missile Carriers	1,320	1,200-1,320
GRAND TOTAL	1,950-2,070	2,250

* Excluding Backfires--estimated at 375 by the end of 1985.

one with fixed wings and optimized for long-distance, high-altitude subsonic flight.[17] (While the Soviets have no present need for a low-level penetrator in view of the current air-defenseless condition of the United States, the former aircraft presumably presents a hedge against a US redeployment of air defenses.) Thus, the Soviets could replace their old bombers and add more by 1985. In addition, of course, they have the refuelable supersonic Backfire B, not covered by the Treaty but only by the appended Statement by President Brezhnev to President Carter to the effect that the Backfire is a medium-range bomber, that the Soviets will not increase its radius of action to enable it to strike targets in the United

States, and that they will not increase its production rate ("confirmed" orally by President Brezhnev not to exceed 30 per year). Not only does this seem to be a strange and low-confidence way to supplement a treaty, but it was followed in less than a month by a report of a new engine for the TU-144 supersonic transport with 50 percent greater fuel efficiency.[18] It seems to have gone widely unnoticed that, according to *Jane's All the World's Aircraft*, this is the same engine that is used in the Backfire.

In contrast, the US figure of 573 includes 230 B-52s in mothballs and simply unrecoverable for combat use. (This misrepresentation of US assets can only be for the domestic purposes of creating the illusion that we do indeed have almost the permitted numbers of vehicles and, almost, equality with the Soviets.) The B-1 has been cancelled. Unless its procurement is reinstated in FY 80, it will probably not be feasible to replace further attrition of the aging B-52s during the life of the Treaty. Thus, as shown in Table 2.3, under present plans the United States will not be able to deploy the permitted total of 2,250 launchers in 1985.

Other Limitations

There are certain other provisions of the Treaty of some significance for our evaluation. It is agreed that no land-based launchers for other ICBMs will be converted to launchers for ICBMs, nor tested for this purpose. It is understood that this provision covers specifically the SS-20, a mobile intermediate-range ballistic missile (IRBM) consisting of the first two stages of the SS-16 ICBM. Since IRBMs are included in the noncentral "Gray Area Systems" that are not covered in the Treaty, there is a potential for the addition of SS-16 third stages to convert SS-20s rapidly into ICBMs. (They could also be converted into ICBM-range missiles by the offloading of some of the warheads, since the missile is MIRVed.) There is a Common Understanding that the USSR will not produce, test, or deploy SS-16s and will not produce third stages for that missile. If verifiable, this is a provision of some importance for the United States, since such conversion of the SS-20 could greatly worsen the already adverse balance that would be codified by the Treaty. But verification appears almost impossible.

Other provisions prohibit the placing of launchers on the seabeds (including inland waters) or in the subsoil thereof, and the testing or deployment of fractional-orbital bombardment systems (FOBS) that enter orbit but are deorbitted to targets before they complete one orbit—a system tested by the Soviets in the past but

which the United States had considered ambiguous in terms of the prohibition on weapons of mass destruction in space under the Treaty on Outer Space.

There is also a statement of intent that the parties will enter into a treaty on strategic offensive arms (SALT III) before the expiration of the present Treaty in 1985. Experience under SALT I and SALT II negotiations has demonstrated that it is difficult to improve one's position by negotiating on matters that have once been conceded in an agreement. Further, Executive proposal and Congressional enactment of such unilateral measures as might be taken during the life of the Treaty to improve the stragetic balance are likely to be inhibited, not furthered, by the signing and ratification of the Treaty, which would tend to support the position and feeling that an acceptable balance had been struck and would be preserved under the Treaty.

The Protocol to the Treaty prohibits certain activities through the end of 1981. These include the deployment of surface-launched cruise missiles of greater than 600-kilometer range, a prohibition of potentially great significance for our European allies, and the testing and deployment of mobile missiles.

It is argued that we would not do these things before 1982 in any event, but this misses the point. It may be very difficult to prevent extension of the Protocol. As this goes to press, we are in the *eighth* year of the *five-year* Interim Agreement. No Senate "reservation" can bind future Administrations or Congresses. The Protocol should be excluded from any Senate approval of ratification.

What the Treaty Will NOT Do

To sum up:

- *The Treaty will NOT maintain the US-Soviet balance of strategic offensive arms at parity or equivalence,* from signing until expiration on December 31, 1985. On the contrary, before 1985 the Soviets may be expected to have more throwweight; ICBM warheads and megatonnage; MIRVed ICBMs; hard-target kill capability; and area, or soft-target, kill capability than the United States *can* have by the end of 1985. Indeed, taking account also of the existing great imbalance in the US strategic defenses (civil, air, and potential ABM defenses), which could not be fully redressed by 1985, the Soviets will have marked strategic superiority by the early 1980s. The effects of this imbalance are already being felt in international bargaining and regional events; international diplomacy tends to anticipate the effects of foreseeable

changes in power balances, much as the stock market discounts recessions in advance.

- *The Treaty will NOT improve the prospects for an equitable SALT III agreement.* The above facts make it clear that in 1985 the United States will be in a much weaker bargaining position than it is today. Experience under SALT I has made it eminently clear that relative capabilities constrain what can be achieved by agreement. In 1972, US ABM technology was far more advanced than that of the Soviet Union, and a permanent ABM Treaty was signed. We are, as noted, in the eighth year of the five-year Interim Agreement on Strategic Offensive Arms signed in 1972. The US relative position has declined during the life of that Agreement, and a permanent follow-up treaty meeting US objectives, including the Jackson Amendment to the Joint Concurring Resolution that brought the Agreement into effect October 3, 1972, has so far eluded us. Moreover, the growing imbalance under the proposed Treaty will mean that the United States will, before 1985, risk having to yield to diplomatic coercion on US interests of far greater import than a SALT III agreement.
- *The Treaty will NOT cover a number of elements of strategic power,* including: number of ICBMs, numbers of warheads, an important class of potentially strategic bombers, "Gray area" systems usable against US allies and potentially against strategic defenses. Thus, quite apart from qualitative growth permitted under the Treaty, the Treaty will not prevent Soviet production and deployments that can further worsen the US strategic position by 1985.
- *The Treaty will NOT protect US relations with its allies,* since it will drastically weaken the once watertight "nuclear umbrella" that in the past counterbalanced the large and growing Soviet superiority in conventional arms and enabled the protection of Western interests in regional crises, which are already increasing in frequency and in demonstrations of US weakness.
- *The Treaty will NOT support the US policy of nonproliferation of nuclear weapons,* which has depended for its success, again, largely on the strength of the US nuclear umbrella.
- *The Treaty will NOT save the United States money.* It will increase the need for qualitative improvement of permitted systems and quantitative increases in systems not covered.[19] This imperative is also seen in the recognized need for improving US conventional capabilities, especially in the European theater, as the strategic nuclear balance has deteriorated (and would be codified

by the Treaty). There is, however, a sense—a dangerous sense—in which the Treaty might indeed save us money: it might give us a false sense of security, strengthening the hand of those opposed to defense expenditures and making more difficult and less likely the approval of permissible measures to maintain an acceptable adverse strategic as well as conventional balance.

By the time this appears in print, the SALT II issue may have been decided. At this time of writing, three alternative outcomes appear possible:

1. The debate will still be underway. It is difficult to expect hearings and debate on this complex subject, which seems esoteric although it is of vital importance to every citizen, to hold Senate/public attention indefinitely. But if the debate has not been resolved this fact must mean that attention is being focused on required programs, which are spelled out below.
2. The Treaty may have been rejected, or Senatorial advice and consent so accompanied by amendments, qualifications and/or understandings as to greatly prolong and possibly kill the prospects for ultimate agreement with the Soviet Union. In this case, it is hoped that the above critique will have been taken into account by the Senate. Many of the points have been made by others, and the author has presented them to some Senators and their staffs and has used every avenue of communication available to him during the hearings and debate.
3. The Treaty may have been consented to, virtually intact. The above critique will still stand, and one can only hope that the Senatorial action will not have a "valium effect" on national concern and willingness to consider the real strategic needs of the nation and to act on them. Unfortunately, the effect of the 1972 SALT I Agreement, and, indeed, of the SALT negotiations that started in 1969, has been largely to inhibit the US strategic force modernization (including defenses) that might have forestalled the strategic imbalance in the 1980s.

Whichever outcome of the Senate debate eventuates this winter, the key question will remain:*

* As this volume appears, a fourth outcome obtains: The Senate debate is in abeyance and the Treaty terms are being observed; this fact enhances the importance of what follows.

CAN THE BALANCE BE CORRECTED?

If the SALT II Treaty debate offers hope of serious attention to corrective actions in the strategic arena, much credit must go to Senator Nunn, as the Senator was the first to dramatize the issue by his demand for a four to five percent real increase in the defense budget before he would consider voting for approval of ratification of the Treaty. At the time of writing, the Administration has replied, in effect, "Billions for defense, not one percent in tribute for SALT." But the political battle lines have been drawn; with an assist from the Soviets by their actions in Cuba, the debate will apparently be shifted for a time from the terms of SALT II to the question of what the United States must do to redress the balance and restore an adequate line of US deterrence/defense.

The Trouble with Percentage Increases

The country should be grateful to Senator Nunn for breaking open the debate, but we would like in this edition of *Arms, Men, and Military Budgets* to suggest a better approach to the adequacy of the national defense—and of defense spending to support it. There are several problems with the approach of specifying a percentage increase in spending:

1. It is politically vulnerable to the familiar charge that "throwing money at problems doesn't solve them."
2. Four to five percent will not be enough.
3. Even if it proved to be enough, it wouldn't make a bad treaty good—the inequities, omissions, and unverifiabilities of the Treaty should still be examined and amendments/reservations to remove them considered on their merits.
4. A percentage increase, without specification of its use, may be quickly dissipated, primarily to the GPF and their support.[20]
5. Most importantly, it won't work.

Point 5 refers not to the President's opposition, or the possibility that the Treaty might be purchased with promises on which delivery would not be made, but rather to some built-in problems that operate against the specified increase being realized. It has been widely pointed out that inflation is likely to exceed predictions and may thus swallow up the intended real, or constant dollar, increases. This is exactly what happened to the three percent increase promised in 1977 in agreement with NATO. It is sometimes even suggested that the underestimation of inflation may be an

Administration trick—deliberate misrepresentation in order to win approval for a budget that it does not intend to implement in real terms.

But there is a less sinister explanation, and it is built into the institutional arrangements. The Director of the Office of Management and Budget (OMB) issues guidelines for estimating inflation, and the DOD Comptroller issues specific directives for the factors to be used in estimating defense costs. (The latter has been done since 1972, when "then-year" costing of long-term programs was mandated by a Congress exasperated by weapons system cost overruns.) Now, clearly, in an inflationary period, the Director of OMB—or any other representative of the Administration—cannot say, "Our attempts to fight inflation are not going to work. The President has issued 7 percent wage-price guidelines, but inflation will be 12 percent." This would be a self-fulfilling prophecy—both the unions and corporations would see to that. Nor can a government representative say that Federal Reserve Board monetary policy will fail or Treasury fiscal policy will fail. The official government estimates become *part* of the inflation fight, however unconvincing they may be. This is not venal but a venial fact of life in a world of uncertain economic behavior and unpredictable inflation rates.

An Alternative Approach: Specific Strategic Options

Fortunately, there is a better way to gain the ends Senator Nunn, and we, seek. Henry Kissinger mentioned it in his subsequent SALT II testimony. This better way is to examine what is needed for defense and then demand that the appropriate programs be funded. DOD can estimate what they will cost, and the Congress can evaluate whether restoring the health of US defense is worth it. Congress can also consider whether savings are available elsewhere, although in general one asks, if so, why have not the other measures already been considered?

The author participated last year in a project that undertook to outline a set of such programs, with emphasis on those that might be feasible by the time of the Soviet achievement of real strategic superiority under present trends, namely, 1982, as shown above. A group of thirteen, calling itself the Strategic Alternatives Team (SAT), emphasized "quick fixes" that could be completed in 1,000 days or less—i.e., up to three years—plus some options that should also be started immediately but would take longer to complete.[21] A year has passed, but "1,000 days" still take us only to early 1983,

even if not everything could be completed by the crucial year of 1982. This only reemphasizes that "it's later than you think." SAT is still reviewing the options. Some of the most promising alternatives defined by the team will be outlined here.

Multiple Aim Point ICBM Systems

Perhaps the most urgent single problem addressed in that study was the vulnerability of the US ICBM force. The problem has been addressed in the MX, the next generation ICBM, full development of which has at long last been approved by President Carter. But the MX will now be available in the *late* 1980s, after the SALT II Treaty expires at the end of 1985. Paul Nitze and William Graham of the SAT team argued that the redeployment of the Minuteman III missile in a multiple protective structure system (MPS), as proposed but abandoned for the MX, is a feasible "quick fix" for the vulnerability of the ICBM force.[22] In essence, it was suggested that additional silos be dug among the existing Minuteman fields (starting with the most advanced and valuable Minuteman III). These silos would not be launchers, since they would not be able to function without a canister in which the missiles would be placed. The Minuteman III missiles would then be adapted to these canisters, which would be moved about from time to time among the additional silos, in what has been called a "shell game." As in the slight-of-hand shell game, the object of the MPS (also called MAPS, for multiple aim point system) is to confuse the observer (the Soviets) as to the exact location of each missile. The canisterization of the Minuteman III has been demonstrated [23] and is estimated to cost about $1 million per missile. The additional holes, or silos, would have perhaps a comparable cost. They would cost less than the original Minuteman silo because with today's technology, much of the original silo equipment will be miniaturized and incorporated in the canister-launcher to perform the targeting and central processor control functions for the missile, C^3 (command, control, and communications) interfaces, and so. Thus, the total cost of the system would be a function of how many additional silos were built, say half to one billion a year for 500 to 1,000 new silos each year (plus the initial half billion for canisters). Such a program could be undertaken over a period of time, the cut-off point being decided by ongoing estimates of the number of Soviet warheads available.

Concurrently with such a program, the Minuteman III production line, closed last year by President Carter, should be reopened.

Additional Minuteman IIIs could be substituted (if SALT II limits were still observed) for obsolete Titan II or obsolescent Minuteman IIs, or for Polaris submarines expected to be retired at a more rapid rate than the new Ohio-class Trident-class submarines can be built. This would mean bringing the US MIRVed ICBM force up to the permitted limit, up to the 820 instead of the present 550, and stockpiling missiles as a hedge against the possibility of Soviet avoidance of the Treaty by placing uncontrolled missiles (of which four types are in current production) on "soft" or hidden launchers, as discussed above. In addition, all Minuteman IIIs ought to be equipped with the new and larger MARK 12A warheads and the INS-20 guidance system with improved accuracy (to be followed as rapidly as possible with the advanced inertial reference system (AIRS) planned for the MX and offering still greater accuracy).

Reopening the Minuteman III line becomes increasingly difficult as components become obsolete and their production facilities may be dismantled. Nevertheless, with prompt action and a "DX" defense production priority it is believed to be still feasible, at a one-time cost of perhaps $200 million, plus a recurring cost in the neighborhood of $4 million per missile (1980 dollars). It seems a prudent hedge at a time when the Soviets have four open ICBM production lines and the United States has none.

SLBMs

The limitations of the SLBM force appear less urgent than those of the vulnerable ICBM force, but here too there are important options for improvement. First, every effort should be made to recover the time lost by program delays in the deployment of both Trident I missiles (slipped from 1979 to 1980 for initial operational capability), the Ohio-class submarine, now down to eight by 1986, and the Trident II missile, the last has now slipped further than the MX, since advanced developmnt has not yet been authorized. But the Trident II, in addition to having a 6,000-mile range that would vastly increase the on-station time and options of the submarines, also has the potential for accuracies comparable to those planned for the MX. As to submarine vulnerabilities, which are clear when they are in port, we have more to say in the section below on defenses. But the other great vulnerability of the submarines is in their difficult communications links with the shore. We have discussed in past editions the gradual demise of the one-time Sanguine system for the deployment of vast but low-powered antennas in certain geologic formations that can broadcast ex-

tremely low frequencies (ELF) signals in the region of 10 to 30 kHz (kiloHertz, or thousands of cycles per second) and wavelengths of thousand kilometers. It is the special properties of these waves that they penetrate the sea to the operating depths of submarines. Communication with the submarines from land-based antenna on towers is, of course, vulnerable to initial Soviet attack, and C^3 is known to be high on Soviet target priority lists. The Tacamo, an airborne aircraft that broadcasts to submarines by trailing an antenna, has prelaunch vulnerability, and increasing airborne numbers appear to be a rather reasonably priced option for submarine C^3 survivability.

We also urge, as in past editions, revival of the Narwhal program for the development of a smaller missile-carrying submarine, but this is a longer-term project that can no longer affect the early mid-1980s.

The B-1

Next are the bombers, which face a number of threats, the greatest of which at the moment appears to be time, in view of the increasing age of the B-52s, all of which were built between 1958 and 1962. In this connection, we have already noted the exaggeration of the US bomber and total launcher numbers in the "Data Base" appended to the SALT II Treaty and the exclusion from the Treaty of the Backfire and other "medium" bombers, which can reach the United States and would have a free ride against the neglible US air defenses. We can only assume that this exaggeration of the size of our bomber force was to reassure the American public, not to fool the Soviet negotiators.

An important next step, therefore, is promptly to reinstate the B-1 bomber program. In 1977, the leadtime was estimated at 32 months. Since then, some work forces and subcontractors have been dispersed. Nevertheless, under pressure, with full government backing ("DX Priority"), that leadtime could probably still be achieved. Thus, in 1982, with the strategic balance nearing its worst, the B-1 could start coming on line. Moreover, the B-1 could be built in several versions, with little additional R&D and great commonality, permitting "learning curve" cost savings on a large portion of total costs. A sensible program would be:

- Start with penetrating B-1s, as now designed and tested.
- Build some B-1 cruise missile carriers, to be available not long after the first cruise missiles are available in quantity.

- Build a cheaper, fixed-wing B-1 (by some 30 percent) optimized for tanker requirements (tankers being a current high-cost, high-risk component of the bomber force).
- Build a few B-1s with the high-altitude supersonic capability (Mach 2.2, as originally planned and then reduced for minor cost savings).

This mix would stress Soviet air defenses to the maximum, retaining the low-altitude penetration capability, with short-range attack missiles (SRAMs) for defense suppression, adding the stand-off cruise missile capability versus non- or lightly defended targets, and retaining the capability for high-altitude attack to force the flushing of interceptors prematurely (to avoid destruction on the ground) and thus disrupt defense planning. The program would also decrease the burdensome and risky tanker requirements. All versions of the aircraft would have the advantage of greater pre-launch survivability against SLBM attack, for which the B-1 was designed (nuclear hardness; quick take-off; ability to use shorter, more numerous runways than the B-52).

Such a force would be economical, taking advantage of (1) the $5.9 billion of past, "sunk" B-1 RDT&E costs, which would have to be repeated (and probably exceeded) to develop a new bomber for the 1990s and to develop or adapt an inferior cruise missile carrier for the 1980s; and (2) a great deal of commonality among the several types of aircraft, which could be built in one facility, with much common tooling and "learning curve" savings on the common engines, wings, empennage, most of the fuselage, landing gear, and some of the avionics. The original program number of 244—pulled out of the air at the time—would not have to be decided on now. The potential would exist for building that number or more, and the Soviets would know it during the SALT III negotiations.

Even if it had been correct on technical grounds, on political grounds the B-1 decision was wrong. First, the B-1 cancellation was one of a series of unilateral decisions—the first by the Carter Administration—that have conveyed to the Soviet Union and to our allies that the United States is in retreat. These decisions, including the delay of the MX and the cruise missile schedules, abandonment of the neutron bomb, the Korean pull-out, (now delayed, if not reversed), the Republic of China treaty abrogation, and so on, were not reciprocated by the Soviet Union, whatever the expectations of those who argue for US unilateral concessions to induce Soviet concessions, a theory never vindicated by Soviet actions.

To refuse to modernize our strategic forces in the face of ongoing, massive Soviet qualitative and quantitative buildup far beyond requirements for parity or deterrence can only lead to increasing Soviet freedom of action in all parts of the globe. We have already witnessed this in the Middle East, Africa, Latin America, and the Indian Ocean. We see it in increasing Soviet intransigence in SALT. There are increasing tendencies toward Ostopolitik in Europe, and increasing risks of Finlandization. If the United States does not move to narrow the Soviet advantage in the early 1980s, with the prospect of overtaking them in subsequent years, then the Soviet leverage will become tremendous. This leverage will not have to be exercised in nuclear war, but it is highly likely to be used for diplomatic coercion of the United States and its allies. Such coercion may be for the acceptance of major *faits accomplis* (in, say, the Middle East, Berlin, Norway, or West Germany); it may be for the United States to give up later programs, such as the MX, or even continuation of the Trident program, or the further modernization of NATO forces. To trust that Soviet superiority will not be so used is to postulate that Soviet ideology, interests, and policy will suddenly change. Even Henry Kissinger has said that his oft-quoted, "What in the name of God is strategic superiority? What is the significance of it politically, militarily, operationally at these levels of numbers? What do you do with it?", was based on "fatigue and exasperation, not analysis." [24]

Secondly, in negotiating SALT II, the B-1 cancellation threw away negotiating strength, one direct consequence of which has been the failure to reach real agreement on the Backfire.

These political drawbacks of the B-1 decision are not new arguments and were not unforeseeable. The arguments have only become more compelling in the light of subsequent events.[25]

Not only are there well-known and valid reasons for having a Triad, or even a "Multad," of strategic forces to guard against surprise attack and technological surprise, but there are special reasons for needing a bomber leg in the Triad. These stem from the fact that missiles, both ICBMs and SLBMs, are pushbutton weapons that, once launched, cannot be stopped from reaching their targets in a matter of minutes. In time of deep crisis, or even when the Soviets may have initiated nuclear warfare, there may be tremendous value in having a system that can be launched and kept under full ("positive") control for several hours, recallable until its components reach the point of no return in six or eight hours, or even longer if they are kept "loitering" outside of Soviet defenses. Such a system would permit the President to make credible threats

while still retaining time for negotiation to terminate hostilities, rather than giving him only minutes within which to make a choice between surrender and the horrors of all-out nuclear war. For many purposes, slowness rather than speed of reaction can be a virtue.[26]

Strategic Defenses

The US inferiority on the defensive side is also a self-inflicted wound. Healing it will take time, but some things can be done rapidly. Defenses not only protect US assets in the event of war—damage limiting—but they also contribute to the deterrence of nuclear war by increasing the uncertainties of the offense and decreasing the confidence of an attack planner.

The rebuilding of US defense could start with increasing the dispersal of our bomber force, including the use of inland bases. This could cost up to a quarter of a billion dollars, but it would be a one-time cost and increased operating costs would be only a few million dollars a year. Such a "passive" defense program would also make it possible to increase the alert rate of the bombers, now a nominal 30 percent, so that more could survive an SLBM attack. Given the additional runways provided by the dispersal program, higher alert rates could be achieved by spending one-quarter to one-half billion dollars a year on increased flight and maintenance crews as well as the fuel and maintenance costs of the flying time that would be required for crew training and readiness. However, a hidden cost would be an increase in the rate at which the aging B-52 force would wear out; thus, this "quick fix" increases the urgency of a follow-on B-1.

Since submarines are vulnerable when in port, a comparable program of increasing the number of crews and the speed of maintenance could result in limited increases in the submarine at-sea rate, at a cost of perhaps one-quarter to one-half billion dollars per year.

We should deny the Soviet bombers a free ride by starting to rebuild our air defenses, increasing the rate of deployment of the airborne warning and control system (AWACS) and deploying F-14s, with Phoenix missiles, or F-15s/F-16s with AIM-7 missiles, to replace the six squadrons of obsolete 1950s F-106s. This action would be quite outside of the SALT domain and might possibly cost $2 to $3 billion per year. We should consider adding Patriot local surface-to-air missile defenses as well. (Patriot is now being developed for field—overseas theater—use only.)

We should spend perhaps another half-billion to one-billion dollars annually on R&D for antisatellite (ASAT) and antiballistic missile (ABM) defenses. This R&D would accelerate our offsetting of the Soviet operational ASAT capability and of their large ABM R&D program, which is likely to give them a capability for rapid breakout from the ABM Treaty in the 1980s. We should also not rule out US abrogation of the ABM Treaty if, as provided in the Treaty, the US "supreme" interests are jeopardized, as they will be by Soviet strategic superiority in the early 1980s. At a minimum, there should be systems "on the shelf" for such contingencies.

There are a number of new ABM concepts on the drawing boards. They should be fully assessed, and selections should be made for development and proof testing. During the lean years of US ABM R&D following the ABM Treaty of 1972, one of the "sweet uses" of adversity has been the realization that great economies and possibly increases in feasibility were achievable by abandoning the high degree of centralization in the Nike X Sentinel and Safeguard ABM systems in favor of distributed systems of autonomous units. Since the performance of no system is perfect, the first "leakage" of a missile through any centralized system will destroy the central components (missile site radars and data processing units) and put the whole system out of business, leaving future incoming missiles a "free ride." (Note that this is very different from the argument used by ABM opponents in the 1969-70 ABM debate to the effect that "if one H-bomb leaked through the defense system it would destroy a city," which ignored the point that one H-bomb would not "destroy" a large city, that saving some cities might be better than saving none, and that saving some "hard point" targets such as missile silos could have very great value.)

For hard point defense, such systems can be designed for low-altitude intercept, which is in principle much cheaper than high-altitude intercept. If such a system were deployed in conjunction with an ICBM MAPS system as described above, and used to preferentially defend the aim point containing a missile—assumed known to the defender and not to the attacker—then a synergistic effect can be achieved, forcing the attacker to use many more warheads to attack one missile. For example, if there are 10 aim points per missile and 1 defending interceptor for those 10, then the attacker requires, in principle, 20 instead of 10 warheads to assure destruction of the 1 missile.

Such low-altitude systems may utilize nuclear or nonnuclear kill

mechanisms. The trade-offs, in addition to cost, include greater certainty of kill by nuclear means against greater political acceptability of the nonnuclear mechanisms. A further synergistic effect may be realized if the low-altitude system is supplemented by a possibly later and more sophisticated high-altitude system. These systems, sometimes called an underlay and overlay, could be independent, unlike the high-altitude and low-altitude interceptors combined in the Nike-X system, with its centralized vulnerable point affecting both. If, for example, both the overlay and the underlay systems had leakage rates as high as 20 percent of the attacking warheads, in combination they would let only four percent penetrate. A number of the alternative possibilities are discussed at greater length by the author in the SAT report.[27]

We should revive the moribund US civil defense program. A $300-million-a-year program was proposed by Secretary Brown in 1978, but President Carter withdrew his support in 1979.

The proposal was primarily for a seven-year program for the development of city evacuation, or "crisis relocation," plans, and preparations. A civil defense program should be much more broadly conceived, as it is in the Soviet Union. It should, in effect, include all passive defense of nonmilitary assets. It should include the protection of the national, state, and local leaderships, beginning with the 16 legally established presidential successors and their minimum necessary support staffs, and other assets (communications, data bases, action plans, and so on) necessary to ensure the continuity of government from crisis through war and the survival, reconstitution, and recovery phases after nuclear attack. It should also include provisions for the sheltering of workers in essential services and industries who cannot be readily evacuated to the countryside, and the protection of the assets which have to function—from fire fighting equipment to medical supplies to essential production materials and inventories. A comprehensive civil defense, or, as it is sometimes now called, civil emergency preparedness program, can contribute to the prospects for maintaining responsibility, cooperation, law and order, and other activities necessary to give the nation the possibility of surviving nuclear attack in a wide range of contingencies, from limited attacks through quite heavy attacks, and from brief nuclear phases through long drawn-out multiple-attack wars. Programs for these contingencies would also contribute to the survival of crisis, i.e., the deterrence of war, and for damage-limiting in limited war, even if there is some level of all-out nuclear war in which civil defense might break down.[28]

Finally, despite the decline in US Navy capabilities (see Chapter 3), strategic antisubmarine warfare (ASW) capabilities should be increased, although we do not estimate the costs thereof here.

Doctrine

It should be noted that we are indeed advocating new hardware and preparations that would permit a real revision in strategic doctrine. It has long been argued in these pages that Assured Destruction was never a moral or credible doctrine and is now not a feasible one. Indeed, Defense Secretary Harold Brown has now said ". . . a strategy based on assured destruction alone no longer is wholly credible." [29] The Secretary was, understandably, vague as to what strategy (and targeting) would be wholly credible.

A credible strategy must go beyond "deterrence only." To deter credibly, a nation must have a war-fighting capability (as does the Soviet Union). To have a war-fighting capability, one must also have a war-fighting strategy (again, as does the Soviet Union).

Initially, a new strategic doctrine means not ceding to the Soviet Union the sole right to a counterforce capability, which the United States must also have if its "extended deterrence" is to be credible to its NATO allies. Doctrinal change, which can contribute to restoring the balance and to making deterrence more credible, does not come free of cost but requires additional expenditures for better intelligence on Soviet targets and better command and control for US forces, as well as adequate accuracy/yield combinations in our ICBMs.

This is not the place for an extended discussion of strategic targeting doctrine, a complex subject under intensive review in the US government, but a few general observations may be made. First, the United States should have a doctrine that attempts to threaten Soviet values rather than "mirror image" US projections of those values. We can tell much about Soviet values from their priorities in passive defense. Passive defense is essentially the artificial enhancement of inherent values of a target, whether by hardening, concealment, dispersal, or mobility. Observation of such defense is, however, not a perfect indicator of values, in that some assets are easier than others to defend passively. Nevertheless, the priorities in the Soviet civil defense tell us something. Their highest priority goes to the concealment and sheltering of leadership, including, according to the CIA, at least 110,000 people at all levels from the top government and party leadership down to oblast and local levels and the managers of large enterprises. This also includes attempts to harden and protect command, control,

and communications (C^3) for this leadership (and for the top military command). Second priority is on the sheltering of key workers, from those in essential municipal and health services to those in essential (war-related) industries, and the protection of their equipment by dispersal, hardening, and stockpiling. Not included here but also a high priority are the military policies of protecting the forces by hardening, concealment, and crisis dispersal. Finally, the general public, i.e., the rest of the population, is to be protected by evacuation from the cities and protection from fall-out.[30]

It is worth noting that the Soviet programs include education of all members of society and planning for their roles during war, which means the assignment of responsibility, feelings of usefulness, and greatly increased prospects for the maintenance rather than the collapse of morale.

How well Soviet civil defense would work in wartime has been disputed.[31] Combat performance of any system may be degraded by many factors, including human error at all levels, but one cannot assume it will fail catastrophically, and one must take account of its contribution to deterrence (of the United States) and to Soviet confidence in crisis, as well as to damage-limiting in war. And the intelligence indicators its priorities may provide are independent of its actual performance.

These Soviet priorities suggest once more the foolishness of the now at least nominally discredited Assured Destruction threat to populations. We should be threatening not our fellow men who have suffered the oppression of a totalitarian dictatorship, but rather the leadership of that totalitarian state, without which it will disintegrate. We should attack its military assets (not only its nuclear forces), to threaten both the power that that leadership uses for its self-perpetuation and the power that it might exert in a postwar world to delay or prevent US recovery and to coerce erstwhile US allies. And we ought to target the essential military support industries without which that military power can not long endure. Soviet protective measures mean, however, that we have a very low probability of succeeding in some of these objectives. This is the reason for the earlier comment that we will need better intelligence (e.g., on the location of Soviet leadership shelters) and better weapons, both in order more effectively to target hard-targets such as underground shelters and nuclear storage sites, and to attack military and industrial targets with greater precision and fewer collateral civilian casualties (since industry and many military installations tend to be placed in or near cities—or, if you prefer, cities tend to grow up around such facilities).

One final word on the arcane subject of targeting: "pure" targeting is neither feasible nor desirable. There are few true "bottlenecks," the complete destruction of which would bring a nation to its knees, and there are few target systems that one can hope completely to destroy. A mixed strategy is likely to be as important for targeting as for most military problems of offense and defense. There is great interaction among the classes of targets: without leadership, the military and industrial sectors will not function; without military support, the leadership will not be able to function; without military protection, the industrial sector will not obtain materials and transportation and communications services, and may even be subject to internal or external attack; without industry, the military will run out of supplies and equipment; and so on.

We cannot leave the question of doctrine without touching on the one other "quick fix" so often put forward as a cheap way out of our strategic problems—curiously, by strange bedfellows of the far right advocates of the use of all force necessary against communism and the far left unilateral disarmers and opponents of military forces in general. This is the argument that the risk of the vulnerability of the ICBM leg of the Triad can be ignored because of the possibility of launching the ICBM force after the enemy has launched his, but before the attacking missiles arrive. This option, variously formulated as a doctrine of "launch on warning" (LOW), "launch out from under attack" (LUA), "launch on assessment," "use 'em or lose 'em," etc., has great appeal to those who believe that "minimum deterrence" will work and to those who believe that it is a virtually cost-free solution, as against costly attempts to build less vulnerable systems.

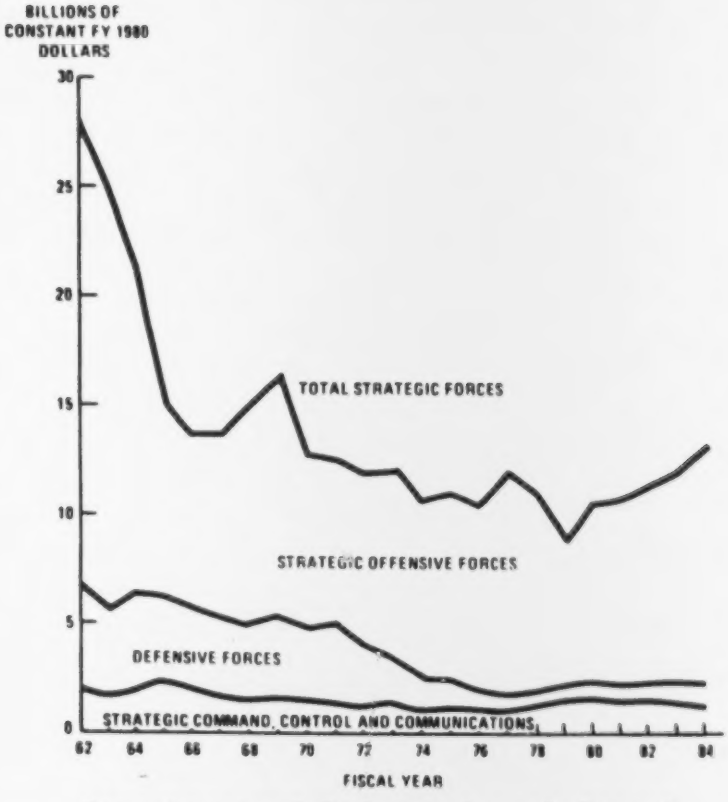
LOW, in any version, is, however, a terribly dangerous doctrine. No attack assessment system can ever be completely free of the possibility of error, false alarms, or failures to alarm. Moreover, the doctrine would require virtually automatic operation. Given that attack detection, assessment, and communication would always take some finite time out of the 30 minutes of ICBM flight time, there would be only a very few minutes, say 10 or 15, in which the President could decide to give the "go" order. Would we even want to have a President who could make such a fateful decision in so few minutes? Certainly, he could have no targeting options. The targeting would have to be preprogrammed. Would it be against enemy silos? We have already seen that during the life of the Treaty the US ICBMs will not be adequate for effective counterforce attack. Moreover, they would be partially wasted on

"empty holes"—we are highly unlikely in this timeframe to have immediate "empty hole assessment" capabilities that would enable us, if we could retarget, to concentrate our forces on the Soviets' withheld missiles (which they could presumably also launch on warning—and, having initiated the exchange, they could have more reliable warning and more adequate decision time). In this case or if we attack other targets—leadership, industry, or other military targets, with tremendous collateral population casualties—we are automatically escalating the war before we know the enemy's full intentions or the possibilities of negotiating some better outcome. The best that can be said for LOW is that it represents an uncertainty for the enemy and its possibility may be a contribution to deterrence that we should not abjure as a matter of declaratory policy (and the Soviets might not believe us if we did) But surely it is not a doctrine on which we should rest the security of the nation. And surely we should not accept a treaty under which it appeared to offer the only option for attempting to maintain deterrence and crisis stability.

Costs

The above is a description of options by which the United States can attempt to prevent the Soviets from obtaining a large and usable margin of strategic superiority in the early 1980s. It is not a detailed development of plans that the DOD could follow and, as observed earlier, it is the DOD that must develop such plans and estimate their costs in detail. We have made educated guesses of the approximate cost of the major elements of these programs. They are given in Table 2.4 in terms of a range of average annual costs for the next three years, if immediate decisions are made (or if some decisions have been made between the time of writing and publication of this volume). Surely less would be spent in the first year than the third. The costs are over and above those already planned by the Administration. They amount to an increment of $6 to $10 billion per year—far more than would be available for the strategic forces under even a five percent increase in the budget. Figure 2.3 shows the trend in the strategic forces budget of the DOD, down in 1979 to one-third of the level in 1962, in constant FY 80 dollars. The five-year projections in the shaded area from 1980 to 1984 show the implications of Table 2.4. In FY 80, there would be a return to somewhere between the level between that of 1966 and 1967 to that of 1965, and by 1984 to something between that of 1965 and 1962. (The projections are carried for five years to allow

FIGURE 2.3
Strategic Forces Budget Trend



Impact of programs in Table IV (author's addendum)

Department of Defense Annual Report, Fiscal Year 1980, page 65.

for uncertainty in when increases would actually start and the need for follow on programs, including acceleration of existing programs for the post-1984 period.)

Viewed in terms of current strategic programs, these are very large programs, in the range of from 50 to 100 percent above current planned efforts. In an economy that has almost doubled in size since 1962, however, they do not appear to be exorbitant. Nor do they seem high in view of either the US-Soviet strategic comparisons made earlier or the CIA comparison showing the Soviets as spending from twice as much on strategic programs in 1968 to three times as much as the United States in 1978.[32]

TABLE 2.4
Possible Costs of Proposed Additional Strategic Programs for the Early 1980s

Average annual expenditure, 1980-82
(in billions of FY 1980 dollars)

Minuteman MAPS	1.0	--	1.3
Reopen MM III line	.2	--	.4
B-1	1.0	--	1.5
Rebase B-52	.1	--	.2
Higher alert rates:			
Bombers	.3	--	.6
SLBMs	.3	--	.6
Air Defense	2.0	--	3.0
R&D--ABM/ASAT	.5	--	1.0
Civil Defense	.3	--	.6
Other (C^3, etc.)	.5	--	1.0
TOTAL	6.2	--	10.2

What Are the Risks and the Gains?

It has been argued that these programs will be intolerable to the Soviets. The latter might increase their programs—but the CIA tells us that their economic strains are growing and limiting their capabilities for the 1980s. In any event, the Soviet Union has always known it cannot win an economic race with the United States and should avoid one—as it has been doing, since the United States has not been racing.

The alternative hypothesis has also been raised: If we threaten to close the so-called window in time of Soviet superiority, they may feel compelled to attack while they can. This is as a dubious thesis—the Soviets cannot want nuclear war, or any war, unless they perceive a vital interest that cannot otherwise be secured, and they will certainly not want a nuclear war without a large margin of superiority.

But if this analysis does underestimate the risk of preemptive attack in the face of new US programs, then we can only assume that the risks of being coerced by the Soviets in the 1980s are already near 100 percent and the time to counter the Soviet drive toward a usable strategic superiority is now. We owe it to ourselves and to our allies. If fear has already superseded US will, it is too late. We do not believe that it is.

NOTES

1. Secretary Brown's 1978 estimates did not foresee a crossover to Soviet superiority. In the span of one year, however, the estimates changed to show Soviet superiority in pre-attack forces, after Soviet Counterforce First Strike, and after US Counterforce Retaliation. In their March 1979 issue, *Armed Forces Journal* challenged Secretary Brown to reconcile the "discrepancies between the two estimates" (p. 16).
2. The data and calculations for the Pentagon charts are classified, as evidenced by the fact that there are no numbers on the ordinance. However, the US Arms Control and Disarmament Agency (ACDA) published an unclassified paper in August of 1978, "U.S. and Soviet Strategic Capabilities through the Mid-1980s: A Comparative Analysis." This study carried the "RFS" technique to its absurd extreme simply by postulating that both sides have 5,000 soft and 1,500 hard targets. The study was thoughtfully critiqued by the Committee on the Present Danger in "An Evaluation of U.S. and Soviet Strategic Capabilities through the Mid-1980s: A Comparative Analysis," September 1978.
3. *Aerospace Daily*, June 25, 1979, p. 268; and *Aviation Week and Space Technology*, June 25, 1979. p. 21.
4. Tests demonstrating a 0.1 nautical mile CEP capability for both the SS-18 and SS-19 were reported by *Aviation Week and Space Technology*, April 3, 1978, p. 14.
5. *Defense/Space Daily*, November 18, 1977, and Robert Aldridge, *The Nation*, March 25, 1978.
6. The terms of the SALT I Interim Agreement on Strategic Offensive Arms and the Vladivostok Accords were described at length in *Arms, Men, and Military Budgets; Issues for Fiscal Year 1979*, pp. 20-32, 1978, pp. 27-38, and 1977, pp. 25-32.
7. For an extended discussion of the implications of *belief* that nuclear war can or cannot be survived, that defense against nuclear weapons is or is not possible, and that nuclear escalation can or cannot be controlled, see R.B. Foster and F.P. Hoeber, "Ideology and Economics: The Case of Civil Defense," *Comparative Strategy*, Volume I, No. 4, Fall 1979.
8. See *Aviation Week and Space Technology*, January 23, 1978, pp. 15-16. In January 1979, the CIA lowered its estimate to 3 percent for 1968-1978. ("A Dollar Cost Comparison of Soviet and U.S. Defense Activities," 1968-1978, CIA 1979), but outside experts believe that number to be too low.

9. See Harold Brown, *Department of Defense Annual Report, Fiscal Year 1979*, p. 112.
10. See Francis P. Hoeber, "How Little is Enough?," *International Security*, Winter 1978/1979, p. 62. See also Daniel Seligman, "Our ICBMs are in Danger," *Fortune*, July 2, 1979, p. 50, and Colin S. Gray, "The Strategic Forces Triad," *Foreign Affairs*, July 1978.
11. President Carter to a Joint Session of Congress, State of the Union Address, January 23, 1979.
12. Launchers at designated test sites used for testing, training, and for exploration and use of outer space are not to be counted unless they are converted to operational use.
13. Jan. M. Lodal, "SALT II and American Security," *Foreign Affairs*, Winter 1978/79, p. 254.
14. *Soviet Aerospace* reported (Volume 25, No. 9, July 2, 1979) that "a recent flight test of the Soviet Union's heavy SS-18 (RS-20) ICBM, limited by the SALT II Treaty to 10 MIRV warheads, demonstrated the capability to independently deploy 20 objects or vehicles." While the SS-18 is limited to 10 RVs in the Treaty, such a test would indicate—in 1979—the Soviet capability for rapid breakout at the expiration of the Treaty on December 31, 1985.
15. *Aviation Week and Space Technology*, June 25, 1979, p. 21.
16. *Washington Star* and *Baltimore Sun*, June 26, 1979.
17. *Aviation Week and Space Technology*, February 19, 1979, p. 14.
18. *Aerospace Daily*, July 9, 1979.
19. It is also interesting that there are direct cost increases associated with the need or desire to assure verifiability to the Soviets under the Treaty. Equipment estimated to cost $33 billion would cost $7 to $9 billion less if it were not necessary to design it as to assure the Soviets of verification of the numbers of missiles deployed.
20. During a breakfast session with reporters, General David C. Jones, Chairman of the Joint Chiefs of Staff, said that the extra funds from a five percent increase for the next few years would go not to such glamorous programs as speeding up the MX or building a new strategic bomber but to the mundane needs of readiness and maintenance, such as improving support services, ship repair, additional ammunition, and spare parts. (John J. Fialka, *The Washington Star*, August 9, 1979, p. 1.).
21. William R. Van Cleave and W. Scott Thompson, ed., *Strategic Options for the Early Eighties, What Can be Done?*, National Strategy Information Center, 1979.
22. Ibid.
23. *Aviation Week and Space Technology*, June 25, 1979, p. 24.
24. *The Washington Star*, June 31, 1979.
25. Francis P. Hoeber, *Slow to Take Offense: Bombers, Cruise Missiles and Prudent Deterrence*, (Washington: Center of Strategic and International Studies, Georgetown University, 1977), 2nd ed. forthcoming, 1980).
26. Ibid.
27. Chapter 4 in Van Cleave and Thompson, *Strategic Options*.
28. See Francis P. Hoeber, "Civil Emergency Preparedness if Deterrence Fails," *Comparative Strategy*, Vol. 1, No. 3, 1979.

29. *Department of Defense Annual Report, Fiscal Year 1980*, p. 75.
30. *Soviet Civil Defense*, Director of Central Intelligence, NI 78-10003, July, 1978.
31. See *An Analysis of Civil Defense and Nuclear Warfare*, U.S. Arms Control and Disarmament Agency, December, 1978, and "The 'Mine Shaft Gap' Revisited: Soviet Civil Defense and U.S. Deterrence," Rep. Les Aspin, December, 1978.
32. "A Dollar Cost Comparison of Soviet and U.S. Defense Activities," p. 6.

3.

General Purpose Forces: Navy and Marine Corps

Norman Polmar and Ray Bessette

The US Navy at the start of the 1980s faces the most difficult challenge encountered since the late 1940s when the future of the Navy seemed threatened by the newly established Air Force and the widely held belief that strategic bombing was the panacea for American defense policy. Only the outbreak of the Korean War in June 1950—a conflict that was in large part a naval war—halted the rapid decline of the Navy and Marine Corps.

Now 30 years after that nadir of US Navy influence and the ill-fated "admiral's revolt," [1] which sought to maintain a more flexible defense policy, the problems the Navy faces are more complex and, in many respects, unsolvable by conventional wisdom. Thirty years ago the "enemy" was the air power advocates; today three major groups are contributing to the decline of the Navy. And, "decline" it surely is as the size of the fleet—and its ability to perform its missions—continues to diminish (see Table 3.1). Whereas the massive post-Vietnam War reductions of the early 1970s primarily discarded older, World War II-built ships, the Navy is now transferring relatively new ships to the reserves because of funding problems. At the same time, prospects for rebuilding the fleet or

even developing a radically different "mix" of ships as a compensation for reduced numbers are diminishing. Table 3.2 shows the five-year shipbuilding plans since the Ford Administration's proposal for FY 78-82. Thus, not only has the fleet been cut back in size, but the near-term prospects for rejuvenation are limited. The current balance between the US and Soviet Navies is shown in Table 3.3.

THE DOMESTIC OPPOSITION

Three major groups have contributed to this situation: The Administration (i.e., DOD and the White House), the Congress, and the Navy itself. President Carter, the first Annapolis graduate to reside in the White House and protégé of Admiral H. G. Rickover, strong advocate of a large, high-technology Navy, might have been expected to push for rebuilding the fleet. Instead he and his Secretary of Defense, former Air Force secretary Harold Brown, have made the central front in Europe the focus of their conventional military policy, in part at the expense of the Navy. In reality, the Navy as *currently configured* has but a limited role in a central front conflict. Reportedly, three Poseidon missile submarines are assigned to the US commander in Europe, who is simultaneously Europe's supreme allied commander, but these weapons have an obviously narrow use. Beyond that, the Sixth Fleet's two carrier task forces [2] and battalion-size Marine assault force would also be of limited use on the central front, especially if there were a simultaneous confrontation or crisis in the Mediterranean or Middle East. At the same time, seaborne reinforcement of Western Europe would be a top naval priority in the Atlantic, but the timing of such a move, the potential vulnerability of convoys to modern sensors and weapons, and other factors tend to reduce the Navy's importance in this context. This is especially true if the war in Europe is brief, perhaps 10 to 14 days, and there are strong indications that it would be of short duration if tactical nuclear weapons were to be used in the early days of such a war.

At the same time, the mobility and mission flexibility of naval forces tend to make much more difficult the analytical assessments that are done for air and ground forces on the central front and strategic forces. This difficulty has obviously become a factor in the analysis and planning of the DOD. Whereas the mobility, endurance, and capability of a squadron of A-10 antitank aircraft, for example, can be carefully measured and analyzed, the carrier task

TABLE 3.1
U.S. ASW: Force Level Trends

	1960	1964	1968	1972	1976	1980
Attack Submarines	111	104	105	94	74	82
Strategic Submarines	2	21	41	41	41	41
Aircraft Carriers	23	24	23	17	13	13
Cruisers-Destroyers	240	241	255	159	95	106
Frigates	41	40	50	66	64	70
Patrol Combatants	4	6	9	16	8	3
Amphibious Warfare	113	133	157	77	62	63
Mine Warfare	81	85	84	31	3	3
Auxiliary	197	263	251	153	116	81
Total Active Ships	812	917	976*	654	476	462
Total Active Aircraft	8,863	8,391	8,491	6,752	5,752	5,200

*Includes battleship New Jersey

TABLE 3.2
Five-Year Shipbuilding Plans

Ships		FY 1980 Cost (M)	Ford/Jan. 1977 FY 1978-1982	Carter/Mar. 1978 FY 1979-1983	Carter/Jan. 1979 FY 1980-1984	Carter FY 1981-1985
SSN	Attack Submarine	$461.5	8	5	5	4
SSBN	Trident Submarine	$1,121.1	8	6	6	5
CVV	Aircraft Carrier	$1,617.1	2	1	1	--
CSGN	Aegis Cruiser	($1,500)*	2	1	--	--
DDG	Aegis Destroyer	$820.2	10	7	10	11
DDX	Advanced Destroyer	--	--	--	1	1
FFG	ASW Frigate	$200.7	56	26	25	2
LSD	Dock Landing Ship		6	2	--	2
MCM	Mine Countermeasure Ship		19	5	5	2
T-AGOS	Surveillance Ship	$30.8	12	12	10	5
---	Auxiliary Ship	--	32	5	4	--
Total Ships			167	70	67	32

*Approximate

TABLE 3.3
US–Soviet Navies (early 1979)

	United States	Soviet Union
Aviation Ships		
Aircraft Carriers	13	2
Helicopter Cruisers	--	2
Helicopter Carriers*	10	--
Surface Combatants		
Missile Cruisers	28	27
All-gun Cruisers	--	10
Destroyers**	72 + (9)	95
Frigates	65	165
Small Combatants		
Missile Units	1	145
Patrol/Torpedo ASW units	2	315
Mine Countermeasure	3 + (22)	195
Submarines		
Diesel attack***	6	160
Nuclear attack***	74	85
Diesel strategic	--	22
Nuclear strategic	41	73#
Amphibious Ships	55	100
Carrier-Based Aircraft##	1,000 + (150	70
Land-based ASW/Patrol Aircraft	216 + (117)	175
Land-based Strike Aircraft	--	350

US numbers in parenthesis are additional ships manned by composite active-Naval Reserve crews and Naval Reserve patrol squadrons.
*Amphibious helicopter assault ships.
**Soviet data includes Krivak class ships.
***Includes torpedo and cruise (guided) missile submarines.
#Includes 65 modern Yankee/Delta classes (12-16 missiles) plus eight older diesel submarines (3-6 missiles).
##Aircraft organized into ship-based wings or squadrons.

force is too complex and possibly has too great a lifespan to be addressed in conventional analytical terms.

A final factor affecting the Administration's views has been chronic shipbuilding problems. Warships traditionally have high unit and operating costs and today these costs have been exacer-

bated by inflation—more so than most military systems because of longer construction times. There have also been shipyard problems and politically motivated disputes about where to build and modernize ships.

The Congress has also become an "enemy" of the Navy. Traditionally the Congress was a friend of the Navy, often voting more ships than a president requested and periodically adding funds for nuclear propulsion when the Administration of the day balked. But this has now changed. According to one Senator, the attitude of Congress has become negative because of the Navy's inability to (1) develop and articulate a strategy for the future use of the Navy, especially against the changing Soviet naval threat and that from Third World military forces; (2) develop and support a long-range shipbuilding program that follows a logical (and affordable) course of development; and (3) manage effectively the ongoing shipbuilding programs.

The Congressional aspects of the naval debate have become more complex because of the emergence of the so-called reform group, primarily on Capitol Hill. In the past, most legislators could be considered in one of two groups: the pro-Navy, who would vote for essentially whatever the admirals requested; and the budget-cutters, who would veto any major naval increase or expansion. Now the reformers have emerged as a group that would have *more* naval capabilities, but *different* ones. They would hope that such "advanced" concepts and technologies as cruise missiles, V/STOL aircraft, surface effect ships, and even nonnuclear submarines could provide an affordable and politically "saleable" fleet that could counter the Soviet threat.

The third "enemy" of the Navy is the Navy itself. Clichés notwithstanding, the Navy has been "unable to get its act together" in the opinion of many Congressional and Administration leaders. The changing of Chiefs of Naval Operations every four years, and their key deputies about twice as often, with each CNO proposing different programs, has helped to destroy what order there could be in long-range planning and "selling" a coherent Navy program. Further, the "platform sponsors"—the CNO's deputies for air, surface, and submarine warfare—still push their own programs, relatively independently of each other's interests, adding to the general mayhem. And, of course, programs that are not linked to specific platforms have great difficulties in being brought forward, with nonacoustic antisubmarine warfare (ASW), V/STOL aircraft, and mine warfare being recent examples of Navy "orphans."

The result of these problems facing the US Navy, in the opinion of the authors of this chapter, is that the Navy will be hard-pressed to maintain the current active fleet of some 450 ships during the coming decades. Indeed, should present trends continue, by the early 1990s the active fleet will consist of some 350 ships . . . or less.

THE SOVIET THREAT

The above-described considerations of the future of the US Navy tend to ignore the primary "threat"—Soviet naval and maritime forces. In brief, Soviet naval capabilities continue to improve and, in several substantive ways, to change. These trends have been particularly evident in the long-range operations of Soviet naval and maritime forces and in procurement programs, with several highly significant efforts coming to light during recent months.

The long-range and multi-ocean interests of the Soviet Navy were highlighted during 1979 by the deployment of the second *Kiev* class aircraft carrier, the *Minsk*, to the Pacific Ocean. Her transit, in company with the prototype assault ship *Ivan Rogov* and several other warships, highlights the increasing Soviet emphasis on operations in the Pacific. There the Soviets confront the United States, China (PRC), and Japan, while increasing their political-military interests along the periphery of the Indian Ocean as well as in Southeast Asia.

The *Minsk* task force was the most powerful Soviet naval grouping ever to enter the Indian or Pacific Oceans and continues a general upgrading of the Soviet Pacific Fleet that began in the mid-1970s (about the time Fleet Admiral N.I. Smirnov, commander of the Pacific Fleet, was named First Deputy Commander-in-Chief of the Soviet Navy and probable successor to the long-serving Admiral Gorshkov). The Pacific Fleet provides most of the ships for Indian Ocean deployments, which have been increasing of late. The *Minsk* force spent almost two months in the Indian Ocean during her transit from the Black Sea to Vladivostok.

The Soviets have gained inroads in Vietnam and are currently flying naval patrol aircraft from former US bases there with the potential of significant naval support facilities being available. In particular, the use of Cam Ranh Bay's massive facilities by the Soviets could greatly affect political and military conditions in the South Pacific and Indian Ocean areas. Farther west, Soviet nuclear-propelled missile submarines have begun using the port of

Aden in South Yemen, significantly raising the level of Soviet military presence at the southern tip of the Arabian pensinula.[3] The Soviets seem to have recovered from their 1977 loss of major Indian Ocean base facilities at Berbera, Somalia. Their unqualified, massive commitment of political and material support for Ethiopia in the war over the Ogaden region cost them the extensive installations they had built at Berbera (again demonstrating Soviet shortsightedness concerning Third World politics). But such losses are considered minor in the Soviet scope of interests in the Middle East-Indian Ocean regions.

Limited use of Ethiopian facilities seems to be available to the Soviets, but South Yemen must be considered as their major air and naval facility in the region at this time. On the subject of base availability—a major concern of Soviet naval planners—one cannot ignore the continued unrest and instability of the Islamic revolutionary government in Iran and the strength of the two Communist groups in that former US ally. The Soviets continue to seek inroads in other states along the Indian Ocean periphery as well as in the Middle East. The availability of air bases in Afghanistan increases this threat. And one cannot discount the possible return of Egypt to an accommodation if not a close relationship with Soviet Russia, somewhat along the lines of Tito's allowing both the USSR and United States to have politicial-military relationships with Yugoslavia.[4]

In the Soviet Pacific Fleet's home waters the marked increase in Soviet forces and activities is beginning to have some effect. Several such factors have led to President Carter's decision not to withdraw the remaining US ground forces (one division) from South Korea, while major increases in Japanese defense spending are predicted. Japanese contacts with South Korea and China are increasing and the Korean Navy is being modernized (with the help of that nation's growing shipbuilding industry). All members of the Association of Southeast Asian Nations (ASEAN) have expressed concern over the Soviet naval-military trends and there have been press reports speculating about increased military cooperation among members of that economically dynamic group of nations.[5]

Still, the severe reductions in US naval forces and the recent strain of US carrier forces maintaining in the Indian Ocean have led to reduced American capabilities in the Western Pacific, a fact that has not gone unnoticed by several nations that rely on US naval forces for political-military stability in the region. In this

respect, the Carter Administration has not demonstrated an understanding of the extent to which the nations of Asia (including the Soviet Union!) are dependent on free use of the sea. The Soviet leadership clearly comprehends the importance of the sea to Soviet interests in the Indian Ocean-Pacific regions.

The three fleets based in European Russia—the Northern, Baltic, and Black Sea Fleets—continue to increase in capabilities and to maintain a high tempo of operations. The Black Sea Fleet provides the surface ships and naval aircraft for the continuous Soviet naval presence in the Mediterranean. (The submarines for the Mediterranean *Eskadra* come from the Northern Fleet because of treaty limitations on submarine passage through the Turkish straits.)

While US political and, at times, military leaders continue to address the limitations of these Soviet fleets to passage through Allied-controlled straits, the situation continues to change, generally in the Soviets' favor. For example, deployment of the SS-N-8 strategic submarine-launched missile in the Soviet submarine force means that, from bases on the Kola and Kamchatka Peninsulas, the Delta-class submarines can strike most of the United States without leaving their home ports. This, of course, brings whole new implications for Western ASW efforts against Soviet missile submarines. The Baltic Fleet—which has few nuclear submarines, no modern strategic missile submarines, and few large surface warships—is intended entirely to fight in the Baltic and Danish straits and not to seek access to the Atlantic (at least not in the early stages of a war). At the same time, virtually unnoticed in the United States, six diesel-propelled Golf II ballistic missile submarines have moved into the Baltic. These can target a number of European NATO targets, giving the Soviets a highly survivable and mobile ballistic missile capability. But in general, Americans have avoided consideration of Soviet nuclear forces that can threaten London, Amsterdam, Copenhagen, Oslo, Brussels, and Bonn, as well as numerous US and NATO military installations.

While the Black Sea Fleet could be "trapped" in that enclosed sea, at any given time the Soviet Mediterranean Fleet outnumbers the US Sixth Fleet, while reinforcements during a crisis have a much shorter distance to steam from Sevastapol, for example, than Norfolk. Strained Turkish-American relations, increasing Soviet economic aid, and the potential of Soviet military aid to Turkey raise new questions about Turkish action against Soviet naval forces in the Dardanelles in any situation short of major war.

Soviet naval deployments continue in the Atlantic, with routine port visits to several nations and some support available at Conakry, Guinea and Luanda, Angola. However, the Guinean government has apparently withdrawn permission for the Soviets to fly long-range Bear reconnaissance/targeting aircraft from Conakry. The Bears now deploy occasionally to Luanda as well as across the Atlantic to Cuba. This "double deployment"—combined with Bears flying from bases on the Kola peninsula—outlines a huge triangle, encompassing the entire North Atlantic Ocean. This gives the Soviet Navy the ability to scan regularly the North Atlantic with these venerable aircraft (with Luanda-based Bears being able to cover the South Atlantic as well). Although these planes could be vulnerable once a shooting war begins, until they are destroyed they can undertake reconnaissance and targeting missions and key-in "quick-look" satellites to areas of specific interest.

On the American side of the Atlantic, the revelation of a Soviet combat brigade of some 2,000 to 3,000 troops in Cuba follows the delivery of two diesel attack submarines to Cuba. The submarines can make use of the long-established Soviet submarine "facility" on the Caribbean island. Some recent expansion of naval facilities in Cuba has also been reported. With the earlier basing of advanced Soviet Flogger fighter-attack aircraft in Cuba and the regular deployment of Red warships to the Caribbean (20 deployments since 1970), Cuba must be considered a forward base of the Soviet armed forces, including the Navy.

A final operational note concerns OKEAN 80, the anticipated series of multi-ocean, large-scale Soviet naval exercises in the spring of 1980. In the springs of 1970 and 1975 the Soviets conducted the largest peacetime naval exercises since World War II. The availability of the *Kiev*-class carriers, the *Ivan Rogov*-class assault ships, Kara and possibly later cruiser classes, and other new ships that have joined the fleet since 1975 promises to make OKEAN 1980 an even more dramatic display of Soviet naval capabilities.

SOVIET HARDWARE

Soviet hardware programs are generally better reported than naval operations, but their significance is often less understood. Several recent developments are apparently intended to further increase the Navy's ability to travel farther and stay longer. More

subtle have been the continued "overlays" of Soviet naval programs on existing efforts without, as too often happens in the West, reducing or terminating the earlier effort.

For example, the Soviet Navy of the 1950s and early 1960s was depicted as a coastal defense force. The coastal defense programs have continued, exemplified by highly effective Grisha-class coastal ASW ships, Nanuchka-class coastal missile ships, and Haze land-based ASW helicopters.

So too has the missile cruiser program that began in the late 1950s been continued. The Kresta classes have apparently been succeeded by an improved oil-burning missile cruiser, while construction of the 10,000-ton conventional Kara class continues. Thus, the Soviets continue simultaneous construction of two different conventional cruiser classes (the last US missile cruiser was begun in 1977; no more are planned[6]). But more significantly, the Soviets are completing the first of a class of nuclear-propelled missile cruisers estimated to displace some 30,000 tons. Except for aircraft carriers, this ship—reportedly named *Kirov*—is the largest warship built by any nation since World War II. Indeed, the ship is some three times the size of the latest US missile cruisers.

However, the most significant Soviet developments in surface warships have been in the field of sea-based aviation. The Soviets' lack of aircraft carriers has long been cited as the rationale for minimizing the threat of the Soviet Navy. Two ASW helicopter carriers built in the 1960s (*Moskva* class) demonstrated their lack of sophistication in air operations (although the ships are fully capable missile cruisers).

But a decade later the first of the *Kiev* class of carriers emerged from the sprawling Nikolayev shipyard. The *Kiev*, at 40,000 tons, carrying some 35 helicopters and V/STOL fighter-attack aircraft plus a full array of modern guns and missiles, is the largest warship yet completed in a Soviet yard. The decision to build the *Kiev* was obviously taken at the highest levels of the Soviet government and represents a major shift in Soviet naval capabilities.

Heretofore, a task force of US cruisers and destroyers could operate virtually anywhere with immunity from Soviet surface forces and, depending upon the scenario and location, with significant capability against Soviet air and submarine forces. The *Kiev* changes that. Her V/STOL aircraft can provide long-range reconnaissance and targeting, intercept US maritime patrol aircraft, and possibly launch missiles against surface ships. Thus, a US carrier

is required to counter a Soviet force that contains a *Kiev*-class carrier. This is not to imply that a *Kiev* is the equal of a US carrier, simply that no other US ship could effectively counter one.

The *Kiev* and *Minsk* are fully operational; a third ship is being completed and a fourth such ship is under construction at Nikolayev. Note that this carrier program has been carried out without any reduction in the construction of coastal craft, other surface warships, or submarines.

The *Kiev* and her sister ships may be the harbinger of still larger Soviet aircraft carriers. Press reports are sketchy, but the Soviets are apparently building another carrier, a ship of perhaps 50,000 to 60,000 tons, probably with nuclear propulsion. The ship will be able to launch and recover conventional combat aircraft, using the catapult and arrested landing techniques long believed to be exclusive to the Western maritime nations.

The candidate aircraft reported for the new carrier is a modified MiG-27 Flogger, a large, 35,000-lb, fighter-attack aircraft. A variable-sweep (swing) wing aircraft that evolved from the MiG-23, the MiG-27 has a 23-mm rapid-fire "Gatling" gun, laser target designator, in some aircraft a terrain avoidance radar, and five pylons for carrying a variety of bombs, missiles, or fuel tanks.

The difficulties inherent in embarking on such a carrier program cannot be underestimated and it will probably be several years before the Soviets have their first large carrier at sea, much less an integrated force of carrier, escorts, and air wing. The carrier herself will not be completed before 1985-1987. But the trend is clear.

At the same time, the Soviet land-based naval air arm is being enhanced with continued delivery of the controversial Tu-22M Backfire swing-wing strike aircraft. In naval service the Backfire carries long-range, Mach 3 antiship missiles. Here again, the current Navy force of some 50 Backfires, supplementing almost 300 older Badger missile strike aircraft, represents a major investment and results from high-level decision. (The Navy appears to be receiving one-half of the Backfire production directly from the assembly line, with the remaining aircraft going to the Soviet strategic bomber force.)

Interestingly, production of the only two modern Soviet ASW aircraft, the Il-38 May patrol aircraft and Ka-25 Hormone helicopter, has ceased.[7] No prototypes of later aircraft in these categories have been reported and there appear to be requirements for more aircraft of both types, the Mays to replace older ASW flying boats and the Hormones to fill deck spots on new Soviet cruisers and

carriers. Could prototypes for new aircraft be escaping Western intelligence (and the inevitable press leaks) or could the Soviets be looking at a new type of shipboard "air" ASW weapon? [8]

For the foreseeable future, Soviet land-based strike aircraft and missile-armed submarines will continue to constitute the main striking force of the Soviet Navy. Submarine production continues at about ten nuclear units per year plus a couple of diesel submarines. (US nuclear submarine completions averaged just over three per year during the 1970s.)

Nuclear submarine production continues with periodic improvements evident in the categories of torpedo-attack submarines (SSN), guided or cruise missile submarines (SSGN), and strategic missile submarines (SSBN). The basic Victor SSN and Charlie SSGN have both been replaced on the building ways by improved versions, lengthened about 20 feet. The reasons for the lengthening are not readily apparent, but may be related to their carrying the new ASW missile-delivered nuclear depth bomb and homing torpedo, the SS-N-15 and SS-N-16, respectively. On the strategic side, the new Delta III is a 10,000-ton-plus SSBN with 16 long-range missiles carrying MIRV warheads.

A small number of diesel attack submarines are still produced, a type not built by the US Navy since 1959. The Tango-class advanced diesel-electric propelled submarine is produced for Soviet service and the Foxtrot for foreign transfer. As evidenced in Table 3.3, the Soviets still maintain a large as well as relatively modern submarine force. While having three times the number of submarines in service as the US Navy, the Soviets can also claim more nuclear-powered submarines than the United States (about 155 versus 115) and more modern strategic ballistic missiles at sea (some 950 compared to 656).

Another recent significant development in the Soviet submarine force was public revelation of the performance of the Alpha-class SSN, the first of which was launched about 1969–1970. The program seems to have been plagued with technical problems, believed to have been associated with a new reactor plant. It now seems that the Alpha's problems were solved and several units have been built. In 1979 press reports described the Alpha as having a top speed of at least 40 knots and an operating depth of 2,000 feet, both significantly greater than US submarine performance.

In addition to a new power plant, the Alpha is believed to have a welded titanium hull, a revolutionary development in submarine construction that gives it a greater depth capability as well as

greater resistence to weapons at lesser depths. There have also been indications of a new weapons system and high degree of automation.

It remains to be seen whether the Alpha with all its attributes will be successful and produced in large numbers. But whatever the results of the program, it is again clear proof of an impressive commitment of resources to the Soviet naval establishment.

There are other programs worthy of review, especially the reported new strategic missile submarine (Typhoon), amphibious ships, underway replenishment ships, and naval-associated satellites, but space limitations of this volume prevent further discussion.

SOVIET TRENDS

During the next few years several factors will affect the size and shape of the Soviet Navy, some tending toward continued growth and some toward reduction. The factors that would tend to result in continued growth include the following.

Steady Shipbuilding in the 1960s and 1970s.

Under Brezhnev and Gorshkov, the Soviet Navy produced a steady stream of surface warships and submarines during the 1960s and 1970s. In contrast, the US Navy suffered, as in the 1960s and early 1970s the Vietnam War consumed considerable funds that could otherwise have been allocated to shipbuilding, while in the 1970s double-digit inflation and, more recently, emphasis on ground and air forces for NATO, have further inhibited shipbuilding.

The steady Soviet construction of the 1960s and 1970s will sustain current Soviet force levels well into the 1990s. Continuation of the current rates (and retirement practices) could lead to a slight increase in the number of surface warships, albeit with a decline in submarines (to perhaps only 260 total units compared to the current 355 active Soviet submarines) by about 1995. However, there appears sufficient flexibility in the existing Soviet submarine construction capability to maintain 300 units with relatively little additional effort.[9]

Increase in Shipbuilding Facilities

The Soviets have devoted considerable resources to increasing the number and capability of their shipbuilding facilities, naval

and commercial, during the 1970s. Thus, in the authors' opinion, the centralized Soviet shipbuilding industry has sufficient flexibility to make moderate or major increases in surface warship and/or submarine construction. Major increases could require a curtailment of merchant ship construction or a reversal of the current trend toward larger warships and naval auxiliaries. For example, the resources that went into constructing a single 40,000-ton *Kiev*-class aircraft carrier could have produced probably three 10,000-ton Kara-class missile cruisers or five or six missile-armed destroyers of about 5,000 tons. Indeed, the current Soviet trends toward larger warships and naval auxiliaries (e.g., the 40,000-ton replenishment ship *Berezina)* could be an indication that naval force level goals have been achieved.

Retaining Units Longer than Estimated

The Soviets have sometimes maintained ships longer than anticipated by the Western intelligence community. Major modernizations can further extend ship life. Also, the relatively low Soviet tempo of naval operations (in comparison with the US Navy) can contribute to longer ship life and hence higher force levels.

Full Employment Goals

The Soviet economic and political systems seek full employment in all areas of endeavor. This is true in the shipyards and supporting industries, and various design bureaus. For example, design bureaus appear to produce new variants or major designs at specified intervals regardless of whether or not the designs are accepted or hardware is produced; similiarly, factories (and shipyards) appear to continue producing units long after they are obsolescent, halting only to tool up for a new design. Major examples of this include the long Bear bomber production run (the first units being produced in 1954 and the last not until the late 1970s, if then) and the Kashin-class destroyers being turned out from late 1962 until 1974.

Thus, current design and production rates must be continued—if not increased—because of industrial plant expansion in the 1970s.

Multi-Class Series Production

The Soviets simultaneously produce several classes of warships. Currently some classes of missile cruisers—including the 25,000-ton, nuclear-propelled Kirov class—and the Krivak frigate are being produced; as are the Charlie II (SSGN), Victor II (SSN), Delta III

(SSBN), Tango (SS), and Alpha (SSN) classes of submarines. In sharp contrast, the US Navy does have three major surface combatant classes under construction, but all are oil-burning ships and all are significantly smaller than the Soviet ships,[10] while only two US submarine classes are being built (the *Los Angeles*-class SSN and *Ohio*-class Trident SSBN).

Series production permits the Soviets to test out more designs and systems, reduces the impact of a design failure, and provides more options for force expansion. The high degree of standardization of Soviet shipyards and widespread modular production techniques increase production options.

At the same time, the following factors could lead to a reduction in the size of the Soviet Navy during the coming years.

People Becoming More Expensive

While Soviet manpower costs are a smaller fraction of total costs than in the US armed services (perhaps 30 percent compared to over 50 percent), they are increasing as overall Soviet habitability standards improve, and their ships deploy farther and longer, and there is more competition for officers' skills in the Soviet civilian economy. Accordingly, one can expect some reduction in the Navy's funds available for R&D as well as hardware procurement.

"Great Russian" Population Growth Slowing

The rate of the "great Russian" population (i.e., those living in the European USSR) is slowing in comparison to the increasing birth rates of the Asiatic peoples of the Soviet Union. The "great Russians" are the people most qualified for handling advanced-technology equipment by virtue of the superior educational opportunities offered them. Thus, the universal military service laws of the USSR will bring in more people overall as the Soviet population increases, but with a smaller fraction qualified for high-technology employment. At the same time, the Soviet armed services are all acquiring increasingly sophisticated equipment. Although legal means are available for the allocation of personnel to specific military assignments, the fraction of the population capable of operating high-technology naval systems will decrease while naval manpower requirements will remain steady or increase.

The reports of the Alpha-class SSN being very highly automated may be a result of the Soviets understanding this trend and at-

tempting to reduce the number of high-technology crew members, albeit by substituting fewer "very" high-technology personnel.

Larger, More Expensive Individual Units

The Soviet Navy's trends toward larger ship units means higher individual unit costs. There is a major competition for resources among the five Soviet armed services. Thus, one can assume that larger and more costly units are likely to result in lower force levels.

Nondefense Demands on Industry

The Soviet industrial base is defense oriented, with military requirements having the highest priority. Indeed, the recent promotion of armaments minister Ustinov to the position of Soviet defense minister, a post previously held by a professional military officer, demonstrates the importance of the demands of defense on industry. However, at the same time, there are increasing nondefense demands on industry. To an admittedly limited but growing extent, these are consumer demands. The trend toward improved living standards will continue, and as the population increases faster than the labor force there will be a greater need for consumer goods and services.

Loss of Brezhnev and Gorshkov

Another factor is the potential loss of the strong Navy support among the leadership of the USSR, and the certain near-term end of the reign of the experienced and highly respected Soviet Navy Commander-in-Chief, Admiral S.G. Gorshkov.[11] Brezhnev is now 72 and in poor health. Since 1964 he has been head of the Communist Party and since 1977 the President of the USSR. He is a "friend" of the Navy, having served as a political officer in the Black Sea area during World War II and as head of the Navy's political department in the early 1950s. Apparently he has had a close and personal relationship with Admiral Gorshkov, Navy C-in-C since 1956. Gorshkov himself, the man who directed the Navy during its rejuvenation from a coastal force to a modern fleet, is now 70. Reports vary as to Gorshkov's health; regardless, he is overweight, is said to drink heavily at times, and has had an arduous quarter-century as C-in-C of the Soviet Navy.

After the retirements or deaths of Brezhnev and Gorshkov it is unlikely that their successors will have the same positive influence

on naval affairs. Indeed, in the budgetary infighting of the five Soviet armed services the absence of Gorshkov and his unequaled experience in the Soviet high command's debates will be a severe loss for the Navy.

Budget battles will be of increasing significance to the future Soviet Navy after the inevitable upcoming changes in political and naval leadership. First, the construction of a nuclear carrier or cruiser, or any other "big navy" ship, means little beyond the attainment of impressive technical goals. Numbers of such ships are required, because it typically takes at least three units in inventory to support one ship continuously deployed. Also, large, sophisticated ships like the *Kievs* and their reported large-deck successors require other ships with complementary capabilities for protection and support, and the logistics tails of such task groups are very long. In the final analysis, the costs of developing, building, and deploying militarily relevant numbers of "big navy" ships like aircraft carriers and nuclear cruisers will be stupendous.

Second, in the changed leadership context the Soviet Navy will undoubtedly be required to justify the enormous amount of resources it has devoted to open-ocean ASW and *apparent* lack of success in performing that mission. Defending the homeland from attacks from the sea is the traditional primary Russian and Soviet naval mission, although the long-range strategic strike mission may now have supplanted it or achieved co-equal status. In any event, the development of Western SLBM systems has for the first time since before World War II rendered the Soviet Navy incapable of countering the threat from the sea. The most serious prior threat was that posed by strike aircraft aboard Western carriers. It took time, but the Soviets developed a series of cruise missiles, plus command and targeting systems, capable of placing the aircraft carrier under very severe threat at great distances from the USSR. Apparently they have not proved capable of doing the same to Western SSBNs, despite devoting most of their surface combatant fleet construction to the problem from the early 1960s on (including the *Kievs*), and a large portion of their aircraft production also. Added to this is a very large R&D expenditure.

A final factor to consider in an evaluation of the Soviet Navy is quality. This is perhaps the most difficult aspect to address with respect to both hardware and people.[12] In general, Soviet military hardware, in comparison to US equipment and platforms, is rugged (primitive?), specialized, and redundant. But this makes it easier for the Soviets to produce, operate, and maintain their Navy.

Given different Soviet operating procedures as well as military doctrine, and the Western concession of the military initiative to the Soviets, some aspects of the qualitative question become moot.

For example, suppose the Soviets are unable to maintain some electronic systems in full operating condition as would be demanded in the US Navy. Tactically, the Soviets use their electronic systems significantly less than their Western counterparts, they will operate systems in a degraded mode more readily, and they have several lesser systems in some instances to do the work of one "better" American electronics set. Add to this Soviet efforts to achieve surprise and overwhelming local tactical superiority, and perhaps our qualitative advantage, if it does exist, tends to dissipate. (Of course, some US authorities contend that the qualitative advantage is no longer American.[13])

With respect to people, the Soviet Navy is forced to accept draftees for three years, being able to retain few beyond that period as enlisted men. Instead, those who remain longer are sent to technical schools and emerge as warrant officers *(michmani)*, the equivalent of the chief petty officers and warrant officers of Western navies. The Soviet officer corps, almost all graduates of one of 11 naval academies,[14] is more technically trained than its American counterpart, and Soviet officers almost always stay for a full career in the Navy.

The favorable public attitude toward military service in the USSR, and especially toward the Navy, plus the many benefits (pay and privileges) accorded to officers, make a naval career a good way of life. As one young Russian woman told a US officer, "A Soviet officer is a hell of a catch." [15] On a professional basis, the Soviet officer serves in the same position much longer than his American counterpart and is generally more technically knowledgeable than his subordinates.

This is not to imply that Soviet naval personnel are "ten feet tall"; rather, that the social, cultural, technological, and military traditions of the United States and Soviet Union are very different, and hence qualitative assessments must be approached with caution.

Thus, a number of factors could influence the future growth or reduction of the Soviet Navy. However, at this time there is a strong and long-term Soviet thrust to the sea that is not being countered in the West and, to some extent, may not even be recognized.

THE THIRD WORLD

While the Soviet Union—both directly and through its surrogates—must be considered the primary antagonist of the West during the decade of the 1980s and beyond, there is an increasing concern about Third World military forces that must be addressed in any analysis of US naval force requirements.

The US armed forces today face sophisticated threats in corners of the world where, in the past, a single US destroyer or cruiser could operate with impunity, and a battalion of Marines carried in amphibious ships could land without meaningful opposition. The West was rudely awakened to the fact that Third World nations could interfere with conventional naval operations on Trafalgar Day, October 21, 1967, when Soviet-made Styx missiles fired by Egyptian missile boats sank an Israeli destroyer without warning. Since then, scores of Third World nations have received relatively sophisticated weapons. These have proliferated through large US and Soviet aid programs; US, Soviet, French, British, and even Israeli sales to nations that do not benefit from such transactions; increases in the technical infrastructure of Third World nations; the reduction in costs and maintenance requirements for modern weapons; and the efforts by Third World nations to develop independent and viable military capabilities.

The weapons that are of most concern here are antiship missiles, usually launched from high-speed craft, and also modern air defense systems (guns and missiles), diesel submarines, antitank guided missiles, and fighter aircraft. Table 3.4 provides an overview of some of the modern weaponry available to Middle East nations. The presence of these weapons in any quantity implies a quantum increase in the risk associated with naval operations in coastal areas, and especially amphibious landings or naval demonstrations close to shore. In some cases, the risk even to US aircraft carrier operations could be considered significant. For example, Libya is credited with 24 MiG-23 Floggers, more than 100 Mirage-V fighter-attack aircraft, and a dozen Tu-22 Blinder supersonic strike aircraft. Almost 40 advanced Mirage F-1 fighters are on order. Thus, admittedly for only a single sortie, the Libyans could conceivably put more than 150 high-performance aircraft into the air against a US naval force.[16]

A Marine battalion landing team, as is normally deployed with the US Sixth Fleet, has a platoon of tanks, a single battery of 155-mm howitzers, and some 2,000 men. Libya is believed to have

TABLE 3.4
Weapons in Mediterranean and Middle Eastern Nations

NATION	Anti-ship Missiles	Submarines	Fighter/ Strike Aircraft	Surface-to-Air Missiles	Anti-Tank Missiles	Modern Tanks
Algeria	●		●	●	●	●
Egypt	●	●	●	●	●	●
Iran	●	●	●	●	●	●
Iraq	●		●	●	●	●
Israel	●	●	●	●	●	●
Jordan			●	●	●	●
Kuwait	●		●	●	●	●
Libya	●	●	●	●	●	●
Morocco			●	●	●	●
Oman	●		●	●	●	
Saudi Arabia	●		●	●	●	●
Sudan			●			●
Syria	●		●	●	●	●
Tunisia	●		●			
UAE	●		●	●	●	
North Yemen			●			
South Yemen			●			●

about 2,000 Soviet tanks. Granted many are in storage, but even a score of modern tanks, if reasonably well employed, plus the country's several hundred antitank guided missiles and modern antiaircraft missiles and guns could make any thought of an amphibious landing at less than divison level improbable.[17]

Admittedly, a naval task force cruising several hundred miles off the coast would be immune to most of these weapons, though the few submarines available to Third World nations could "get lucky" under certain circumstances. But if the naval force is to have a political or military influence—the purpose of modern naval forces—it must influence events ashore through close-in demonstrations, air strikes, troop landings, or blockade. These actions require the ships to close (or launch aircraft), exposing them (or their aircraft) to these modern weapons. Within perhaps 100 or 200 miles of a coast, a few missile boats carrying Styx, Gabriel, Exocet, or Harpoon missiles, *if properly employed*, could be devastating to a much larger force of conventional warships.

Two further points should be made. First, the threat should be considered as being composed of two elements: the weapons available to the country and the likelihood of their being used. The US Navy has never been in combat with the Soviet Navy and there is ample reason to believe that the leadership of both nations will seek to avoid direct confrontations. Thus the requirement for the US Navy in the context of fighting the Soviets—even in a strict war at sea context—should be considered in terms of deterrence, to provide a credible threat to the entire Soviet Fleet.

On the other hand, the US Navy has periodically found itself in confrontation or conflict in the Third World—North Korea, Vietnam, Cambodia, Cuba, and Lebanon. Continued dependence on the Third World for resources and markets, and political instability as well as Soviet interests there, will lead to continued US naval exposure to these weapons.

Second, modern weapons can outlive the governments that purchase them. For example, instead of having a heavily armed ally in Iran, as was the situation two years ago, the United States now faces, *at best*, an unstable government with a neutral attitude; at worst, an outright adversary. Of course, the US has already experienced "the worst" in the context of Vietnam, where thousands of tons of US equipment, scores of aircraft, hundreds of riverine craft, radio and cryptologic equipment, and innumerable other military items are now held by a close ally of the USSR.

Thus, a vendor or donor must realize that he does not have com-

plete control over equipment, once it is transferred. This must be tempered with the knowledge that if he does not provide the arms, someone else probably will (a recent example being Greek purchase of French fighter aircraft after traditionally buying US products, and the potential Soviet sale of arms to Turkey).

This is the environment in which the US Navy must operate in the 1980s and beyond. Decisions on strategy and tactics, as well as hardware and force levels, must take these conditions into account if the United States is to exploit the seas in using the resources and markets of the Third World.

US NAVY ROLES, MISSIONS, AND FORCES

US Navy GPF consist of all Navy and Marine Corps forces except the 41 strategic missile submarines (SSBN). These forces have two missions—sea control and power projection. Sea control is the protection of friendly naval and merchant forces from enemy air, surface, or submarine attack. Power projection is the use of sea-based forces—air or naval attacks, blockade, or amphibious landings (or missile attack in the strategic context)—to influence events ashore. Power projection generally requires sea control to ensure the safe arrival of the projection forces in the forward area.

When Admiral Zumwalt was CNO (1970-1974) he segregated strategic attack (deterrence) and the use of naval forces for political presence as separate missions, for a total of four missions. These were useful descriptions from a viewpoint of describing the flexibility and multimission aspects of naval forces.

However, the different missions are not valid distinctions when addressing hardware and peacetime forces. For example, a US aircraft carrier has both sea control (e.g., ASW) and projection (e.g., fighter and attack) aircraft. Is the carrier a sea control or projection platform? Does the accompanying cruiser contribute to projection by defending the carrier? What if the carrier's aircraft are used against enemy submarine bases? Or if the cruiser conducts a port visit during a crisis to influence local politics ashore?

Thus, the terms must be used advisedly. Unfortunately, as noted above, the use of only two terms—sea control and power projection—has limited political and analytical utility.

On a day-to-day basis the Navy practices both sea control and power projection. However, in many respects it is unable to do either on a realistic basis. For example, Navy planners still think in terms of a US carrier task force ("battle group") operating against

Soviet bases on the Kola peninsula, while amphibious ship requirements are still calculated in terms of division-size ("marine amphibious force") lift.

In reality the operation of a carrier task force in the Norwegian Sea to launch a strike against Kola bases would expose the US force to a devastating array of Soviet air and naval forces. The amphibious shipping needed to carry a reinforced division would mean assembling essentially all 63 active US amphibious ships, including ships that are in dry dock for overhaul, and others routinely deployed in the Far East and Mediterranean. And, if there is a mine threat (recall Inchon and Wonsan in 1950 . . . and North Korea did not have a "navy"), the US mine countermeasure capability is limited to helicopters for shallow-water sweeping and slow (15-knot) deep-water minesweepers manned by reservists.[18] The helicopters (RH-53D Sea Stallions) also have limited mobility; they must be airlifted or transported by ship to the forward area, and then based ashore or on carriers or amphibious helicopter ships (LHA/LPH). If based afloat, the probable situation if mines are impeding US landings, then the RH-53Ds displace other Navy or Marine aircraft.

Rather than being configured to perform such sea control and power projection missions, the US Navy is normally deployed in peacetime in response to political considerations. In general, the Navy is organized and deployed in the following peacetime configuration:

- Aircraft Carriers—Two in the Mediterranean and two in the Western Pacific-Indian Ocean on a continuous basis.
- Cruisers-Destroyers—Six or more with each carrier, plus a small number with amphibious and underway replenishment groups.
- Frigates—Several available for amphibious and underway replenishment groups (although in wartime they would also be required for merchant convoys).
- Amphibious Ships—Sixty-three in nine amphibious squadrons/groups to permit continuous forward deployment of one squadron (with Marine battalion embarked) in the Mediterranean and two squadrons in the Western Pacific.
- Attack Submarines—Several deployed in the Mediterranean and Western Pacific, plus probably some patrols and reconnaissance missions in forward areas (e.g., Norwegian-Barents Sea).
- Underway Replenishment Ships (UNREP)—Approximately 65 to

provide mobile logistics support, primarily for the forward-deployed carrier forces.

In addition, on a peacetime basis some destroyers and/or frigates are kept in the Persian Gulf area, about three surface ships and a submarine make the annual UNITAS training cruise around South America, and there are limited training deployments into the North Atlantic for NATO exercises and demonstrations.

One set of force level requirements derived by Navy planners is shown in Table 3.5. These numbers seek to meet the US commitments in peace and war on the bases of the above deployments. The second column indicates the actual ships in active commission.

Beyond the shortfall in numbers, there are some qualitative problems. For example, US ASW ships have only short-range weapons, depending on helicopters to deliver ASW torpedoes against submarines detected more than a few miles away. Currently the embarked LAMPS [19] helicopter is the SH-2, a converted utility helicopter that originally entered service from 1962 onward and was converted to the ASW role in the 1970s. There are insufficient SH-2s to fill all the cruiser-destroyer-frigate helicopter spaces.

The new LAMPS, the SH-60B Seahawk, will begin joining the fleet in the mid-1980s. But even *if* all 200 helicopters now planned are procured there will be a shortfall of some 40 to 60 aircraft if one considers training and other pipeline requirements. This shortfall will be met by retaining numerous older, less capable ASW helicopters.

Estimates of the forces required to "do the job" vary. Several different parts of the Navy have different estimates of requirements. And, extra-Navy estimates are numerous: individual senators and representatives have made up estimates, as have the Congressional Research Service, Congressional Budget Office, the Joint Chiefs of Staff, the program analysis staff of the DOD, and even the National Security Council.

Depending upon one's point of view, and possibly one's politics, virtually any fleet level can be justified. Still, there are parameters or boundaries. For example, the various force levels for cruisers, destroyers, and frigates (collectively called "surface combatants") derived by the above groups range from some 500 (Joint Chiefs of Staff "prudent risk") to a minimum requirement of 276 postulated

TABLE 3.5
US Navy Force Level Requirements

	Current Requirement	Currently Available
Aircraft Carriers	12	13*
Cruisers-Destroyers		
with carriers	96	
with amphibious	16	100
with convoys	10	
in overhaul/conversion	2	
	(124)	
Frigates		
with amphibious	7	
with convoys	90	65 **
with UNREP ships	36	
in overhaul/conversion	19	
	(152)	
Amphibious Ships	~ 60	65
Attack Submarines	90	80

*Only 12 air wings organized.
**Does not include several Coast Guard cutters with limited ASW capabilities (no anti-air capabilities and limited readiness)

by the Navy Sea Plan 2000 Study. As of January 1980 the US Navy's surface combat ships total 165. One could, under certain scenarios, add in the twelve reserve-manned destroyers that will be available. This is 109 ships below the minimum postulated Navy requirement; it is 135 ships below the mean of 312 if one considers all of the recent studies.

A similar situation occurs in several other categories of ships. In total numbers, the Navy's leadership seeks a "balanced" fleet of some 600 active ships, or about 200 less than available in the pre-Vietnam period. Even including the civilian-manned UNREP ships, the Navy currently has a total of only 450 ships. Not only is it unlikely that the number will increase significantly in the 1980s,

but it will probably decline, at least slightly in the later 1980s and then severely in the 1990s.

Table 3.6 shows the future of the Navy *assuming no additional ships are funded after FY 80,* (which began October 1, 1979).

US NAVAL FORCES

The following discussion addresses the major categories of US naval forces.

Strategic Missile Submarines

While not included in GPF, strategic missile submarines (SSBN) are relevant to a discussion of those forces because they compete for submarine construction facilities, personnel, and other resources, and are included in total Navy force levels and budgets.

The Navy's 41 SSBNs each carry 16 Submarine-Launched Ballistic Missiles (SLBM) and are generally credited as being the most survivable portion of the nation's strategic Triad. All 41 submarines were completed in the relatively brief period of 1960 to 1967. The oldest ten—still carrying the Multiple Re-entry Vehicle (MRV) warhead Polaris A-3 missile—are now approaching the end of their useful service lives. The 31 later submarines, all carrying the Multiple Independently targeted Re-entry Vehicle (MIRV) Poseidon or improved Trident missile, will probably last some 25 to 30 years, with the last being retired about 1996.

The replacement for the Polaris-Poseidon force was to have been the giant Trident submarine, displacing some 18,700 tons (double that of the earlier submarines) and carrying 24 missiles. To keep up the current level of 656 SLBMs the Navy would require 27 Tridents. However, to date (through FY 80) only eight Tridents have been authorized (192 missiles). If the Navy were to build the other 19 Tridents, considering their 4½-year construction periods, the FY 81-91 budgets would have to fund an annual average of two submarines. This is more than double the rate that the first eight Tridents were programmed.

It is highly unlikely that Congress will fund many, if any, more Trident SSBNs. The current cost (FY 80) is $1.2 billion per ship, or about half the cost of a 94,000-ton nuclear aircraft carrier!

There is thus increasing pressure from progressive or reform elements in Congress and several leading naval analysts to develop a smaller, cheaper SSBN design. One proposed alternative is to construct additional (and updated) 8,250-ton SSBNs of the *Lafayette*

TABLE 3.6
US Navy Force Levels, 1985–2000
(With No Ships Funded Beyond FY 1980)

Type	(Service Life)	1985	1990	1995	2000
Strategic Submarines	(20-25 yrs.)*	38	20	8	8
Attack Submarines	(25-30 yrs.)**	90	87	80	53
Aircraft Carriers	(30 yrs.)***	13	9	5	4
Cruisers-Destroyers	(30 yrs.)	97	93	53	43
Frigates	(30 yrs.)	104	102	98	71
Amphibious Ships	(30 yrs.)	58	54	45	26

*

**

***Assumes one new carrier funded in FY 1980.

class, each carrying 16 Trident missiles. Some of the existing *Lafayettes* are being refitted with Tridents, demonstrating the feasibility of the concept.

A more efficient new Trident SSBN design of smaller size could be developed, but that process could cause a delay of several years. If a more capable SSBN than the *Lafayette* is deemed necessary, the next most viable alternative would seem to be a relatively simple enlargement of the *Los Angeles*-class attack submarine (SSN) to carry 16 missiles. This concept was demonstrated in the late 1950s when the first US Navy SSBNs were built to a modified SSN design.

Either alternative would provide a significantly cheaper SSBN, which would also be much cheaper to maintain, supply, and man because of its similarity to existing Navy submarines. A more realistic SLBM force for the 1990s would consist of the eight authorized Trident SSBNs (192 missiles) plus 29 to 25 smaller SSBNs (464 to 400 missiles). The latter option would permit a force of some 600 SLBMs in the deterrent force, probably the lowest number that the Congress would accept in the present international environment. Building the 25 new-type SSBNs at the rate of two per year would probably cost slightly less than 19 additional Tridents and while the SLBM force would be smaller, it would probably be more survivable (more, smaller units) and be more palatable to Congress than building more Tridents.

Attack Submarines

The Navy currently has 74 nuclear-powered attack submarines (SSN) and six diesel attack submarines (SS). Stated Navy requirements are for 90 SSNs. Considering the retirement rate of older SS/SSNs after 25 years of service, the 90-unit force level can be met only with a construction rate of some three and one-half SSNs per year. But the current FY 80–84 Five-Year-Defense Plan provides for only one SSN per year.

Ironically, the SSNs now under construction (taking some four years to build) will provide a 90-SSN force level for a brief period in the mid-1980s. Thereafter the one-per-year rate would lead to a decline to some 70 SSNs by 2000. Here again, there is significant dissatisfaction with the current, *Los Angeles*-class of SSNs. These submarines are relatively large at 6,900 tons compared to 4,650 tons for the previous class. The only significant improvement in the *Los Angeles* for a one-third increase in size is an increase in speed of

perhaps 5 to 6 knots. Most other characteristics—weapons, sonar, quieting—are similar.

The added speed could be significant in the relatively new SSN role of providing direct support (i.e., escort/sonar search) for carrier task groups. But for most other missions, especially ASW against Soviet undersea craft, the few added knots are of questionable value. A *Los Angeles* SSN costs some $500 million. Cost is, to a great extent, proportional to size, with the questionable requirement for higher speed (and thus a much larger power plant) adding a premium to the cost of the *Los Angeles*.

Several members of Congress and naval analysts are again arguing for a "low-mix" SSN and possibly a new nonnuclear attack submarine to complement the 35 *Los Angeles*-class SSNs authorized through FY 80. That is an ample number to provide direct support to carriers. Additional SSNs could be slower-speed ships, possibly minimum updates to the previous *Sturgeon* or *Permit* class. The cost of such SSNs would be perhaps two-thirds that of a *Los Angeles*. This scheme could provide half again as many SSNs for the cost of the ten attack submarines now proposed in the FY 81-90 period.

A final consideration in the attack submarine category is nonnuclear units. The US Navy stopped building diesel attack submarines in 1959 because the high submerged endurance and speed of SSNs was too great an advantage. However, the high cost of today's SSNs, the high costs of employing them as training targets for US ASW forces, and the high capability of conventional submarines in regional and narrow seas, have combined to renew US interest in such craft.

The German firm of HDW has produced an excellent 2,000-ton submarine design that has interested some US officials and Congressional staffers.[20] There have even been suggestions of constructing a submarine for the US Navy in the German yard to acquire quickly a lead ship. Britain and France (and, of course, the Soviet Union) have also pursued the development of advanced conventional submarines. Although the US *Barbel*-class diesel submarines are among the most capable afloat, the last was completed in 1959 and their design is several years older. Perhaps an "Americanization" of the HDW-2000 would be the best US option *if* it were stipulated that the modifications (e.g., to carry US weapons) would be minimal and time constrained so as not to delay the acquisition of the submarines.

It must be stressed that most advocates of new US diesel sub-

marines, including a few US submarine officers, see the SS program as a supplement to SSN procurement, with the latter program to consist of a "low-mix" SSN after 35 *Los Angeles*-class ships are completed. Taking into account Congressional interest in an SS program, it could be possible for the Navy to achieve an attack submarine force in excess of 90 units for roughly the cost of the currently planned one-per-year *Los Angeles* scheme.

Aircraft Carriers

The modern US carrier is the world's largest, most costly, and most controversial warship. However, it is also the most capable warship afloat, being able to operate some 75 to 95 aircraft for sustained periods in forward areas. Further, it is not subject to the political restrictions of overseas land bases.

The controversy over aircraft carriers is based on their high costs (over $2 billion for a modern, nuclear-propelled ship) and questions of their survivability against hostile attack. The latter factor is perhaps the least understood aspect of carriers. *All* modern military systems are vulnerable to some weapons at some times in some locations. Put most simply, the aircraft carrier is significantly less vulnerable than a land base or any other surface ship, while possessing considerable military capability. In 1971, CNO Admiral E.R. Zumwalt observed: "We do not build ships because they are invulnerable, but because they are useful despite their vulnerability. . . . The *Nimitz* class carriers . . . will be the best protected and least vulnerable carriers ever built."

The United States is currently building two *Nimitz*-class, 94,000-ton nuclear-propelled ships. When the first is completed in 1982 the Navy will have 14 aircraft carriers, as shown in Table 3.7. At that time the 35-year-old *Coral Sea*, which cannot operate modern aircraft, will be broken up for scrap; the similarly limited (and older) *Midway* will then be relegated to coastal training duties, leaving the Navy with 12 large carriers of post-war design, eight oil-burning and four nuclear propelled. This is a sufficient force to keep four forward deployed continuously in peacetime, two in the North Atlantic-Mediterranean and two in the Pacific-Indian Oceans. (The *Nimitz* voted in the FY 1980 budget will not be operational until about 1987.)

However, the oldest flattops of the *Forrestal* class are already approaching the end of their nominal 30-year lives. To delay their demise, late in 1979 the Navy began the Service Life Extension Program (SLEP) to modernize sequentially those ships for another

TABLE 3.7
US Aircraft Carriers

Number	Type*	Class Name	Commission	Displacement	Aircraft
2	CV	Midway	1945-1947	∿64,000 tons	∿75
4	CV	Forrestal	1955-1959	∿78,000 tons	∿85
4	CV	Improved Forrestal	1961-1968	∿81,000 tons	∿85
1	CVN	Enterprise	1961	∿90,000 tons	∿95
3**	CVN	Nimitz	1975-1982	∿94,000 tons	∿95

*CV = aircraft carrier; CVN = nuclear-propelled aircraft carrier.

**Third ship, Carl Vinson, to complete in 1982.

10 to 15 years of service. This work will take each ship out of service for at least two and one-half years and cost over $500 million per ship. One carrier will be undergoing SLEP at any given time for the next decade at least. Thus, to ensure four forward deployed carriers, the Navy has sought a 13th modern ship. The Carter Administration did not request a carrier in FY 79, but promised to put a new 60,000-ton ship in the FY 80 budget. Designated CVV, this would have been a one-of-a-kind carrier, of slightly more capability than the *Midway* class. Congress nevertheless voted another 94,000-ton *Nimitz*, and Mr. Carter promptly vetoed the final defense bill.

A similar situation occured in the FY 80 bill; the House opted for a *Nimitz* and the Senate for a repeat Improved *Forrestal*, with the joint bill providing for this fourth *Nimitz*. But there would be no presidential veto during the debate on SALT and preparations for the 1980 political compaigns.

It appears stupid to pursue the single CVV for $1.7 billion at this time. Either of the larger ships is more capable and more cost-effective for a nominal increase in cost.

But the carrier situation will become still more complex in the 1980s. In the opinion of the authors, the costs and duration of the SLEP program yard periods will continue to escalate, so that perhaps only one of the four *Forrestals* will be modernized. The result would be the availability of only ten large carriers from about 1985 onward (i.e., only three carriers continuously deployed in peacetime). More large carriers will not be palatable to future Administrations or the Congress.[21] One alternative appears viable at this time, the V/STOL ship.

V/STOL Ships

Vertical/Short Take-Off and Landing (V/STOL) aircraft reached the practical stage with the British-developed Harrier light attack jet of the late 1960s. Now flown by the US Marine Corps, Royal Air Force, Royal Navy, and Spanish Navy, the Harrier is a "first-generation" V/STOL aircraft.[22] Still, it has operated successfully during at-sea deployments in US helicopter carriers and, during 1976–1977, in a US aircraft carrier deployed to the Mediterranean.

In the early 1970s, Admiral Zumwalt had planned at least eight 14,000-ton carriers with Harriers and helicopters, but they were rejected by Congress as being too small and too slow for even effective convoy escort. Later, some Navy leaders sought a more capable, 25,000-ton V/STOL ship, but such innovative concepts were dropped as defense budget cuts occurred.

The obvious method of carrying naval aircraft to sea—*if* large carriers cannot be obtained—is to construct V/STOL ships. True, V/STOL aircraft are less capable than conventional aircraft, but they do have valid potential capabilities, especially in ASW, Airborne Early Warning (AEW), and the over-the-horizon targeting of cruise missiles. Various improved Harrier designs are available, while Bell, Grumman, and other US aerospace firms appear to have valid designs for improved ASW/AEW aircraft that could be operational by the early 1990s.

Thus, an immediate decision to develop V/STOL ships could provide a useful supplement to a reduced US carrier force of the late 1980s and 1990s. Those ships would initially carry improved Harriers and helicopters, with "second-generation" V/STOL aircraft becoming available in the early 1990s. The V/STOL ship designs are essentially completed. Assuming final approval of one additional (and final!) large-deck carrier in FY 80, the FY 81 budget should provide long-lead funding for a 25,000-ton V/STOL ship in the FY 82 budget. That sort of commitment will be a clear signal to the aerospace industry that their investment in advanced V/STOL aircraft is justified and will provide the base for US development of a larger carrier force should the Soviet Navy continue its drive to put more aviation at sea. At this time the lead 25,000-ton V/STOL ship should cost some $810 million.

Cruisers and Destroyers

The distinction between cruisers and destroyers has become blurred with respect to their size, cost, capabilities, and employment, and they are easily grouped together for discussion purposes. At the time of this writing, the US Navy has 100 cruisers and destroyers in active service. Several additional ships are under construction. When those currently authorized are completed by about 1983, and some of the older ships have dropped out, the Navy's cruiser-destroyer force will have:

9 CGN nuclear powered missile cruisers
1 CG AEGIS missile cruiser [23]
18 CG missile cruisers
4 DDG modern missile destroyers
33 DDG older missile destroyers
31 DD modern ASW destroyers

The most significant shortfall in the 1980s and 1990s with that force will be in the category of Aegis ships. Aegis is an advanced

weapon system, using the phased-array SPY-1 radar for rapid target detection and weapon control. A minimum of one Aegis ship is required for each carrier to counter the Soviet antiship missile threat of the 1980s and beyond.

The Carter Administration has a second Aegis ship in the FY 80 budget with several more planned at a cost of almost $800 million per ship (FY 80 dollars). The Navy would like to see a force of 24 Aegis destroyers, but that seems impossible on cost grounds. Instead, after the construction of perhaps 12 to 18 Aegis cruisers in the 1980s, the Navy is planning an advanced destroyer design, the DDGX. Some 45 to 50 are proposed for construction by the year 2000, with a "target" displacement of 6,000 to 7,000 tons and primarily an antiaircraft armament. Obviously, such a small ship would have to sacrifice some capabilities, including probably some speed, total missile capacity, guns, and possibly helicopter facilities.

At this time a much more viable alternative to the proposed DDGX approach seems to be the continued construction of ships based on the current *Spruance* design. These could be missile ships with the Aegis SPY-1 radars or other, advanced systems. The large, 563-foot *Spruance* hull has demonstrated its flexibility in the ASW destroyers being built for the Navy, four missile ships built originally for Iran, and the Aegis CG/DDG-47. Thus, a *Spruance* DDGX is technically feasible, with all basic design and hull/propulsion R&D having been already accomplished. In the fleet, a *Spruance* DDGX would result in simplified logistics, training, and maintenance.

Although the *Spruance* DDGX would be larger than the "new" DDGX (the authors feel 7,000 tons is the minimum size that would be built), costs would be similar (and possibly less) in using the *Spruance* because much of the detailed design and tooling already exists.

While it is also questionable if 45 or more DDGX-type ships will be built, some new "destroyer" design is needed in the 1980s to replace some of the older missile ships and to complement the large number of less capable frigates that the Navy will have.

Frigates

Frigates are primarily ASW ships intended to escort amphibious ships, merchant convoys, and auxiliary ships. The long-standing Soviet submarine threat has led to several major US frigate construction programs since the early 1950s. The current *Perry* class,

the lead ship of which was completed in late 1977, also has a limited antiaircraft missile capability.

Frigates are "low-mix" ships, incapable of countering large-scale aircraft or missile attacks. At this time the US Navy has 63 relatively modern frigates, plus three ships with more limited capabilities. Another 33 *Perry*-class ships are under construction and six more are funded in the FY 80 budget. By about 1985 the Navy will thus have 103 modern frigates—comprising almost one-quarter of the total active fleet. In effect, the US Navy will have become largely a "low-mix" Navy.[24]

Obviously, in a reduced-size Navy, the 103-frigate force is sufficient. Indeed, it is unlikely that there will be sufficient ASW helicopters available for these ships. While the Navy leadership has talked in terms of as many as 35 more of these ships, that number is obviously unrealistic. Rather, the FY 80 buy of six ships should be the last, with an acceleration instead of the Aegis CG/DDG-47 program to produce perhaps three ships per year (instead of the current two-plus) until 16 to 18 ships are available. At the same time, preparations should be made for converting the four or six latest nuclear cruisers to an Aegis configuration in the late 1980s, and beginning construction of the *Spruance* DDGX design. These ships could provide the quality and quantity needed to complement the existing low-mix frigate force in the face of Soviet and Third World air-surface-submarine threats. At the same time, the existing 103 modern frigates should be upgraded with towed sonars and ASW helicopters in order to exploit their full potential. Both the towed sonar (only six exist in the US Navy today) and helicopters are essential if the frigates are to be viable in the 1980s and beyond.

However, the fiscal 1981-1985 five-year plan published by Secretary Brown in early 1980 calls for the construction of 15 additional *Perry*-class ships, followed by the development of a smaller class of frigates (now called FFX). The continued construction of the *Perry* class is in large part politically motivated, with shipyards in Washington, Maine, and California engaged in the program. Significantly, frigates appears to be the only category of warships where the number available in the later 1980s and 1990s exceeds the Navy's current force objective. The planned expenditures for 15 FFG-7s plus perhaps five of the new, FFX design during the next years could well be spent more productively on perhaps six of the DDG/CG-47 class missile ships with the Aegis air defense system.

A fatal casualty was the plan to develop a prototype 3,000-ton

Surface Effect Ship (SES) that could serve as the prototype for an 80-knot-plus frigate. The Navy has built two smaller, 100-ton experimental SES, and had proposed the 2,000 to 3,000-tonner as the next step in providing a high-speed ASW ship. Congress approved funding for the large ship, but the DOD, under the Carter Administration strongly opposed to advanced-technology Navy programs, has cancelled the project on several occasions. Finally, no funds were provided in the fiscal 1980 budget and the project has died.

Amphibious Ships

A major element in US world power status is the ability to forward-deploy and, if necessary, land Marines overseas. This capability is important to allies and a concern to potential enemies despite the relative vulnerability of the classic amphibious assault. Currently the US Navy has 63 amphibious ships in service or under construction. These are large, 20-knot ships with a total "lift" capacity of some 50,000 Marines and their equipment and vehicles, plus helicopters and landing craft. Although this lift can accommodate just over one Marine division and many support units, the ships are divided between the Atlantic and Pacific areas, some 15 to 20 percent are in overhaul at any given time, and many ships are at sea keeping one Marine battalion continouously deployed in the Mediterranean and two in the Western Pacific.

Thus, a better way to address the amphibious force is in terms of a 12-battalion lift, with at least three continuously deployed overseas in peacetime. This force appears "reasonable" for the foreseeable future, but to maintain some 64 ships new construction must continue. The Navy-Marine Corps had planned to build eight large dock landing ships (LSD) in the 1980s to replace a similar number built during the Korean War. However, the DOD has balked at the new ships. "Some" LSDs are now planned, but certainly not eight. Without the LSDs the Marines' ability to carry the planned air cushion landing craft (LCAC) with their assault force is limited.

At the same time, the cost of the LCACs, the Marines' need for large-scale helicopter and amphibious tractor procurement in the 1980s, and the late 1980s decision point for the construction of replacement helicopter carriers in the early 1990s tend to throw the whole amphibious ship picture into disarray.

One recent and interesting development has been a reported DOD proposal to provide the Marines with up to nine "ro-ro" (roll-on/roll-off vehicle) ships built to commercial standards. These

ships, with speeds significantly in excess of 20 knots, would provide considerable capability for carrying vehicles in "administrative" landings, i.e., where piers are available, or pontoon ramps can be built out from the beach. These ships could ably replace the older LSDs at far less cost *if* they are built to merchant standards with minimal Navy redesign.

Beyond these ships, future Navy amphibious ship procurement might concentrate on helicopter carriers beginning in the late 1980s, for as Third World nations increase their firepower and Navy carriers decline in number, the Marines will increasingly be forced to use V/STOL aircraft for support and helicopters for coming onto the beach (or behind the beach). It is thus possible to keep up a 60-odd ship amphibious force in the 1980s and 1990s, but probably only with the use of merchant designs. At the same time, the next generation of amphibious tractors as well as the LCAC landing craft may have to be sacrificed for the more important V/STOL and helicopter components of the Navy-Marine assault force, while future naval contruction that can be undertaken within the severe budget limitations must stress helicopter-V/STOL amphibious ships.

Mine Countermeasures

In part closely related to amphibious operations, Mine Countermeasures (MCM) are very important to the US Navy because of long-established Soviet interest in mine warfare and the ability of even minor navies (or even merchant ships and small craft) to lay minefields. During the Korean War the North Koreans, without a navy, almost deterred the critical US assault on Inchon in 1950 and did delay the landings at Wonsan by six days (and caused the loss of four allied minesweepers there).

Today the US Navy has only 3 old minesweepers in active service (mostly for research), another 24 old units manned by composite reserve-active crews, and 24 minesweeping helicopters. The ships are old (built in the early 1950s) and slow (14 knots). The helicopters—RH-53D models—are effective only for shallow-water operations, require transport to forward areas (by C-5A aircraft or ship) and once there require secure air bases or ports where they can be loaded aboard carriers or amphibious ships, thus displacing other aircraft.

In the face of recent Soviet mine developments, the Navy is procuring a small number of "super" RH-53E helicopters (the largest in US military service), and is planning two new classes of MCM

ships. The first group of ships will be a small number, perhaps 12, wooden-hull minesweepers similar to those built in the 1950s, but with updated equipment. Like their predecessors, they will be too slow to accompany amphibious ships.

The second MCM class, which has now been postponed into the late 1980s, is intended for sweeping deep-ocean mines such as the new Soviet Cluster Bay and Cluster Gulf. These ships were to have a conventional monohull design, but the delay of the program provides the opportunity to use the so-called SWATH twin-hull design.[25] Although the Navy has rejected SWATH (beyond a laboratory-sponsored 100-ton range support ship), the design could provide a stable and highly capable ocean-going MCM ship.

Thus, some belated efforts are now underway to rectify the MCM situation. The basing problem with respect to MCM helicopters could be reduced with the deployment of V/STOL carriers.

Patrol Combatants

The US Navy has traditionally had little interest in patrol ships and craft, primarily because of the long-range, open-water operations of the fleet and the nature of foreign naval threats. Of course, periodically there has been brief emphasis on small craft, as in the Vietnam War, but those can generally be developed and built quickly. In a major departure from past practice, Admiral Zumwalt in the early 1970s initiated a program of 230-ton, high-speed hydrofoil missile boats (PHM). The PHMs were intended to "shadow" Soviet warships in restricted areas, such as the eastern Mediterranean and North Sea, with their Harpoon antiship missiles providing a potent strike capability. This would spare the Navy the need to devote its more expensive combatants to operations in restricted waters.

Lack of Navy support for the program after Zumwalt left office and DOD opposition to advanced-technology Navy programs—plus drastic cost escalation—led to cancellation of the planned 30 PHMs except for the already-building lead ship, the *Pegasus*. But Congress refused to rescind the funds that had already been voted for the next five PHMs, and those five units will be completed soon.

Carrier-Based Aircraft

Even if the Navy is able to obtain its goal of having 12 deployable large-deck aircraft carriers for the foreseeable future, it will experience increasing difficulty in finding enough aircraft to put aboard them. The problem is especially acute for fighter/attack

aircraft. According to Navy estimates, the fleet requires at least 160 to 200 new fighter/attack aircraft annually, just to offset normal attrition if it is to maintain current Navy and Marine Corps force levels.[26] In the past five years before the current (FY 80) budget, the Navy procured only an average of 83 fighter/attack aircraft per year (the FY 80 budget provides 61). The slack has been taken up by absorbing airraft made excess by the gradual reduction in the number of carrier air wings from 17 to 12 in the past decade. However, this excess has disappeared, and keeping the current force levels will now have to come from building new fighter/attack aircraft and extending the lives of older ones through major modification and overhaul. The FY 80 Five Year Defense Plan recognizes the shortfall and projects a buildup in fighter/attack procurement to 210 by FY 84. Such a program, if enacted, would go a long way toward filling out the carrier air wings. However, such projections have not proven reliable in the past. In the case of fighter/attack aircraft, the increase in real spending for procurement between FY 80 and 84 is about 150 percent ($1.4 billion to $3.5 billion), and for all aircraft the increase is about 75 percent ($4.0 billion to $6.9 billion). The authors believe that such increases—which alone translate to a 3 to 4 percent annual increase in real funding for the entire Navy for the five-year period—are highly unlikely, and that funding will at best remain constant at approximately FY 80 levels.

The immediate funding and numbers "crunch" is largely due to the high cost of getting the new F/A-18 Hornet through its preproduction test phase and into full production. At that point, unit cost will fall markedly and more of the fighter/attack shortfalls can be addressed. The F/A-18 is designed to perform both the fighter and attack missions, replacing existing F-4, A-7, A-4 and, possibly, AV-8A aircraft in both the Navy and Marine Corps. Those four aircraft represent most of the Navy/Marine Corps tactical aircraft inventory and they are aging fast. The Navy is in a race against time to get the F/A-18 into production soon enough to prevent really serious fighter/attack inventory shortfalls. Pushing the introduction of a high-performance aircraft like the F/A-18 into the fleet is risky. Much time, and money, can be lost if production aircraft are built with the faults that a rushed development program did not have the time to discover. The F/A-18 is being brought along as quickly as possible, but even if everything goes well it will be the mid-1980s before significant numbers reach the fleet. The Administration is preparing to pay for this massive new

program (1,366 aircraft programmed, at an average unit cost estimated to be over $17 million) by terminating the A-6 program, probably terminating the Marines' AV-8B (see Marine Corps issues, below) and cutting back production of the F-14, the only other production fighter and the only immediate option for reducing fighter/attack aircraft inventory shortfalls in the early 1980s.

According to current planning, enough F/A-18s will be produced to replace all current Navy fighter/attack aircraft except the F-14 and A-6 by the late 1980s, assuming that there are no serious delays or cuts in the program. However, even at best the Navy will probably in the early to mid-1980s be forced to extend the service lives of some of its current fighter/attack planes, and/or draw down unit equipment levels in order to maintain the current force structure.

The Navy's aircraft carriers are now multi-mission ships, each having an air wing with five squadrons of fighter and attack aircraft, plus two squadrons of ASW aircraft as well as several specialized reconnaissance, electronic, and tanker aircraft. The DOD has directed that the ten-plane S-3A ASW squadron be removed (and the planes converted to tanker, cargo, and electronic roles). The loss of this relatively new and highly effective plane would cause a significant gap in fleet ASW capabilities, especially in forward areas where land bases for P-3 Orions are not available. The other carrier ASW squadrons fly six relatively old SH-3 Sea King helicopters. These aircraft, although useful for their dipping sonar and quick-reaction ability, will wear out in the 1980s.

A viable—but expensive—alternative to the S-3 and SH-3 would be a new V/STOL aircraft. An ASW/AEW aircraft of this type would be invaluable for future carrier operations and several aerospace firms, notably Bell and Grumman, have come forth with realistic proposals. But here again, the cost for development and production is high, while removal of the existing ASW aircraft will make the "selling" of a V/STOL to the DOD that much more difficult.

Maritime Patrol Aircraft

The Navy operates a total of 37 patrol squadrons—24 active, 13 reserve—each of which fly nine P-3 Orions. The principal mission of these aircraft is detection and attack of hostile submarines, and they conduct frequent long-range missions over the Atlantic, Pacific, and Indian Oceans, and the Mediterranean Sea. By virtue of their high speed and effective sensors, they represent the Navy's

best long-range, quick-reaction ASW system. To further increase the aircraft's versatility, the P-3 is being provided an antisurface ship capability by the addition of Harpoon air-to-surface missiles.

Since their introduction into the fleet in the mid-1960s, the Orions have been the subject of continual modification and improvement, and the third major variant, the P-3C, is still being procured. However, the early P-3s are now showing their age, and in its FY 80 budget request the Navy asked for funds to study what the P-3 replacement should be like. Depending on the projected size and capabilities of the fleet in the mid-1980s, the replacement aircraft may be considerably more than primarily an ASW aircraft like the P-3, which was not designed to engage hostile surface ship or shore targets. In the mid-1970s the so-called Big Mother aircraft concept was proposed. This aircraft would have been capable of staying on patrol for about 24 hours and would have carried powerful, long-range air-to-air and air-to-surface missiles, as well as ASW weapons. In effect, it would have been a multipurpose naval vehicle, land-based, capable of engaging hostile subsurface, surface, and air forces, and to some extent (it was argued) being able to compensate for reduced force levels of surface ships as well as aircraft. Perhaps the Big Mother was too far ahead of its time, but the authors believe that the next "patrol" aircraft will carry a good deal more punch than that name implies. It may well be a modification of a wide-body commercial jet aircraft.[27]

Containerized Systems

Of the many suggested methods of solving the problems posed by the shortage of Navy combatants, one of the most interesting is the Arapaho concept, which envisions placing containerized weapon systems and/or support systems aboard merchant ships or auxiliaries to give them an immediate self-defense, or even area defense capability. For example, a system that "containerizes" all of the support equipment and personnel berthing spaces required to maintain an ASW helicopter aboard a civilian container ship has already been designed under the Arapaho program and is being tested. Other potential uses of the concept are not hard to think of: small point defense missile and gun systems, for example, or even a towed sonar array complete with processing and communications equipment. The particular promise of the Arapaho concept appears to lie in its potential for making ASW defense of Europe-bound wartime convoys easier by providing more ASW helicopter platforms, and possibly, more ASW sensors than com-

batant ship escorts could provide. This idea becomes particularly important if very large-area, dispersed convoy or single-ship sailings are adopted. Such arrangements offer real advantages in some tactical situations, but make it virtually impossible for a few escorts to protect the convoy effectively. Arapaho, by dispersing and adding to the convoy's ASW capability, could contribute greatly to the convoy commander's tactical options.

Auxiliary Ships

The Navy operates slightly more than 100 major auxiliary ships, about 70 of which are designed to provide fuel, munitions, and provisions to forward-deployed naval forces, with the remainder providing maintenance, repairs, and other fleet support. There are also perhaps another 100 small auxiliaries (e.g., tugs) plus specialized research, survey, and miscellaneous units. About one-fifth of the major auxiliaries are civilian-manned, as are a large portion of the smaller units. Civilian manning of underway replenishment and fleet support ships has proven to be a success, providing highly skilled crews for demanding replenishment at sea missions, plus freeing Navymen for other service.

Auxiliaries have a low priority in the Navy's construction budget, but some must be built, particularly the underway replenishment oilers, ammunition and stores ships that support the long-range carrier battle groups. The importance of such ships was well illustrated during the period of intensive carrier air strikes against Vietnam, when the carrier air wings delivered ordnance at such a rate that daily replenishment of the carriers was required. Wherever a carrier group goes the replenishment ships will not be far away. Large tenders for cruiser-destroyer and submarine maintenance are also an essential feature of the modern Navy, particularly with today's ever more complex ships and equipment and reduced manning levels.

The major auxiliary program in the FY 80 FYDP, however, is not for a fleet support ship but for ten civilian-manned T-AGOS units carrying the Surveillance Towed Array Sonar (SURTAS), a highly effective passive sonar array. These ships will conduct patrols to supplement existing seafloor submarine detection systems.

Marine Corps

The US Marine Corps—with 190,000 men in a three-division ground force and three air wings—is itself larger than the armed forces of all but the top few of the world's industrialized nations.

Nevertheless, increasing personnel and equipment costs, plus the greatly improved defenses worldwide that future Marine landings would have to face, will probably combine to reduce the Corps from its current 30 maneuver (rifle and tank) battalions and 25 fighter/attack squadrons.

The structure of the Corps, and that of the Navy amphibious shipping intended to transport Marine forces and land them on hostile shores, has, fundamentally, changed little from that of the Pacific island-hopping campaigns of World War II. Then, as today, the emphasis was on inserting large infantry units, supported directly by close air support aircraft and naval gunfire. The main problem the Marines face today is that the highly complex troop landing evolution—involving large numbers of amphibious ships, landing craft, and helicopters—is highly vulnerable to determined opposition by forces armed with modern weapons, and too cumbersome to make use of surprise. Amphibious shipping is in short supply, and it would take perhaps a month to assemble enough (about 50 ships) to land simultaneously one of the division/air wing forces.[28] Once on the beach after an opposed landing, Marine ground forces would be in serious difficulty if the enemy had significant armored forces, since the Marines have very few tanks and no armored personnel carriers. Furthermore, secure sea lines of communication to the beachhead must be kept clear, a job for the Navy's carriers if opposition is at all serious. Declining Navy force levels make the availability of a carrier battle group for operations at any given time or place increasingly questionable. Thus, the difficulty of inserting sizeable Marine forces on hostile coasts and supporting them afterward tends to overshadow their undoubted high level of professionalism, combat experience, and firepower.

The apparent mismatch between the Marines' present capabilities and their traditional missions has not been lost on the Administration and many members of Congress. Unfortunately, the only response noted thus far has been to cut Marine Corps programs as being of not much help, without great effort being devoted to rethinking the Marines' roles and missions. In the fall of 1977, for example, the Secretary of Defense decided to reduce the number of Marine fighter squadrons from 12 to 9 and to cut back development of the advanced Harrier (AV-8B) light attack V/STOL aircraft. The AV-8B is the Marines' highest priority and the aircraft they see as being the best available for land-based, fast-reaction, close air support. The cuts in the fighter squadron force levels did not materialize, but the Administration has subsequently refused

funds to procure the AV-8B. Other programs viewed by the Marines as highly important, but that are in considerable trouble, include the LSD-41-class dock landing ship and the LCAC air cushion landing craft. The latter is designed to bridge the gap between the ability of Marine helicopters to deliver large numbers of men to the beach relatively quickly, and the slow pace with which their heavy equipment and supplies arrive by landing craft. Critics of all three programs can say, with some justification, that—in the numbers that can be afforded—they will not help the Marines perform demanding assault landing missions.

The Administration has suggested that the Marines should orient themselves more to a NATO role, but this idea has apparently not been thought out fully, or at least has not appeared programmatically, except perhaps in the case of the F/A-18 versus AV-8B controversy. The Administration eliminated the Marines' request for the AV-8B in favor of increased procurement of the ubiquitous F/A-18. The F/A-18 is a far better tactical fighter than the AV-8B, by most standards, but lacks the AV-8B's V/STOL ability, much prized by the Marines for close air support operations. The Administration's action was probably due mainly to cost considerations and the desire to standardize on tactical aircraft, but it is nonetheless true that the F/A-18 would be of far more use to the Marines in a high-threat NATO/Warsaw Pact environment than the AV-8B. But the Marines need a lot more than high-performance aircraft to operate against the Warsaw Pact; they also need to be mechanized and armored. This could conceivably be done by prepositioning tanks and armored personnel carriers in Europe (as the Army does) to be manned by Marines flown or shipped in at times of crisis. The re-equipment of the Marines could perhaps be financed by lowering the number of (very expensive) fighter/attack squadrons and by reducing or not replacing specialized amphibious landing ships. This would have the added benefit of freeing Navy personnel and support assets for application to combatant ships. However, if this were done to any significant degree, the Marines would be more of an Army unit than anything else. Tanks, other armored vehicles, heavy artillery pieces, and all other such heavy, sophisticated weapons required to fight in a NATO/Warsaw Pact conflict simply cannot be carried around by ship in the numbers required. How the Administration intends to put the Marines into the Central Front and let them remain Marines has not been answered.

Only one thing appears certain at this point—the Marine Corps' present force levels will decline. Particularly severe will be the

increasing shortfall in amphibious lift if the LSD-41 program, or a substitute, is not authorized. Aircraft inventories will fall, too.

The Marine Corps currently has 27 squadrons with high-performance, fixed-wing aircraft:

12 fighter-attack	12 F-4 Phantom each
5 attack	16 A-4M Skyhawk each
5 all-weather attack	12 A-6E Intruder each
3 V/STOL attack	20 AV-8A Harrier each
1 electronic	15 EA-6A/B
1 reconnaissance	21 RF-4B Phantom

The F-4 Phantoms and A-4 Skyhawks will require replacement during the 1980s, while the AV-8A Harriers will be upgraded to AV-8C configurations. The replacements for the Phantoms and Skyhawks will be the F/A-18 Hornet under DOD planning. But the Marines want the AV-8B Harrier, which is more expensive and whose acquisition would raise the cost to the Navy of the F/A-18 program through the smaller production run which would result. The Marine Corps probably has enough support in Congress to push through the AV-8B, especially if some foreign sales can be garnered. The cost to the Marines—in dollars and support—will unquestionably result in a smaller air arm, with probably some or all of the 12 fighter-attack squadrons being disbanded to provide perhaps five or six AV-8B squadrons plus the three with AV-8C aircraft. The A-6E will be kept for its unique night/all-weather capability, as will the EA-6B jamming and some reconnaissance aircraft.

On the assault helicopter side, the six heavy squadrons with CH-53 helicopters will be kept, and partially upgraded with the 16-ton-capacity CH-53E. But the ten squadrons flying CH-46s will not survive the 1980s. Alternatives are to upgrade some of the CH-46s (reducing their availability in the 1980s) or replacing them with the Army's UH-60B Blackhawk, which the Marines claim is too small. The large production run of the UH-60/SH-60 for the Army and Navy makes the helicopter an attractive, low-cost replacement for the CH-46. However, if the Marines upgrade the CH-46 to last into the early 1990s, it may be then feasible to introduce a V/STOL assault aircraft as its replacement. The Bell XV-15 "tilt-rotor" aircraft gives promise of scaling up to an effective (albeit expensive) high-speed assault aircraft for the Marines.

Despite these predictions of major reductions in Marine strength,

the forward-deploying of 2,000-man reinforced battalions aboard ships in the Mediterranean and Western Pacific, and at times smaller units elsewhere, still have a tremendous political-military value. Although limited in their assault landing capability, their making an "administrative" landing (in ports) could demonstrate American support for local governments and stiffen friendly Third World military forces.

Perhaps this type of force could be viable with more emphasis on helicopters (for rapid landing and taking control of key inland installations) and nonassault ships (such as ro-ro vehicle ships instead of LSDs). Although this would inhibit the ability to make assault landings, it could ensure a continued ability of the Navy-Marine "team" to keep several battalions forward deployed in strategic or crisis areas. The cost may be a smaller Marine Corps—perhaps only two divisions instead of three—but the alternative could be a smaller force that still tries to do both the assault landing and NATO reinforcement mission, and neither particularly well.

REDUCING NAVY COMMITMENTS

If more ships and aircraft cannot be provided to make the Navy's strength a better match for its commitments, an alternative is to reduce the commitments. Needless to say, this alternative is very sensitive politically, both at home and abroad. Perhaps as a trial balloon, the Carter Administration issued a Draft Consolidated Guidance paper to the armed services in the spring of 1978. The guidance itself was not published, but the reaction of then Secretary of the Navy Graham Claytor is available. According to Claytor, the guidance called for pulling the Sixth Fleet out of the Mediterranean in wartime and leaving naval operations there to Mediterranean NATO nations. Similarly, the Norwegian Sea would be conceded to the Soviets. The Secretary saw the guidance as ". . . changing the Navy's basic mission from selective sea control worldwide to defense of a sea lane from Norfolk to the English Channel, [which] will lead inevitably to the conclusion that a smaller and somewhat less capable Navy is somehow logical." [29] If the Draft Consolidated Guidance was approved by President Carter in that form, it has not been released to the public, and statements by Navy leaders do not reflect it. Yet it is clear that the high cost of the Navy, particularly of large aircraft carriers and first-line fighter/attack aircraft, has led many in the Administration and in

Congress to think along the lines of the Draft Consolidated Guidance. If the Navy only did not have to face the Soviet Navy in the Mediterranean and Norwegian Seas, this line of reasoning runs, then the requirement for large deck carriers—highly sophisticated aircraft like the F-14, F/A-18, and A-6 and expensive escort ships like the Aegis CG/DDG-47—can be reduced considerably and much money saved. True enough, but the political impact of conceding that the United States is prepared to leave its NATO allies to their own devices on their sensitive seaward flanks would be very expensive in several ways.

CHANGE OF US STRATEGY

Another alternative is to employ the US naval forces available more effectively. Admiral Thomas Hayward, who relieved Admiral James Holloway as CNO in July 1978, made some significant statements along these lines in 1979 Congressional testimony on the FY 80 budget, his first as CNO. Admiral Hayward set forth eight "strategic principles" that outline naval strategy in more detail, and with more clarity, than most of his predecessors.

First, any conflict between NATO and the Warsaw Pact will be worldwide in scope, necessitating, among other things, protecting vital SLOCs across the North Atlantic, Pacific, and Indian Oceans. In addition, "we clearly have to consider the Mediterranean and Norwegian Seas. Our interest obviously lies in maintaining a worldwide naval strike capability which threatens potential enemies from a variety of directions, tying down defensive forces and greatly complicating the enemy's strategic calculations and force deployments."

Second, US Navy forces must be offensively capable, and able to take the fight to the enemy's navy. The CNO sees the aircraft carrier battle force as being optimally suited for the implementation of this principle.

Third, the US Navy is outnumbered, and likely to remain so. The "critical margin" over the Soviet Navy is provided by superior US tactical aviation, technology, and at-sea endurance.

Fourth, the US Navy "must exploit Soviet geographical disadvantages and continue to deploy naval forces in locales which provide us strategic advantage. It's important that the Soviets understand that in war there will be no sanctuaries for their forces. Keeping the Soviets preoccupied with defensive concerns locks up Soviet naval forces in areas close to the USSR. . . ."

Fifth, the current narrow margin of US advantage requires that ". . . every effort be made to integrate relevant capabilities of the other US services and US allies into the campaign to defeat the Soviet and Warsaw Pact navies."

Sixth, ". . . we will fight a major war with essentially what we have at its outset. . . ." which requires, among other things, that each US Navy unit must be as offensively capable as possible. Further, the active and reserve components must be of sufficient size and capability to prevail since there will be little opportunity to expand existing forces once the fighting has begun.

Seventh, US naval commanders must employ the concept of calculated risk, and only select engagement opportunities that promise attrition ratios favorable to the US side. The reduced size of the fleet demands this.

Finally, naval forces, because of their inherent mobility and flexibility, will be especially important in the force balance existing at the end of a NATO/Warsaw Pact conflict.

Clearly, Admiral Hayward is not thinking along the lines of the previous years' Draft Consolidated Guidance. Especially noteworthy points in his testimony seem to be a renewed emphasis on offense, on taking the battle to the enemy navy in its home waters, and on relying more heavily on other US forces and allies to help share the burden. The other principles are perhaps more familiar, and none of them are startlingly new. But taken together they seem to suggest that the simplest way to win the war at sea is to defeat the Soviet Navy in its home waters, where it is at its maximum geographic disadvantage. This is not the same as laying back in the Western Mediterranean or south of the Greenland-Iceland-UK gap waiting to fight in open water, as some believe to be the limit of the Navy's ability. The emphasis on integrating the capabilities of the Navy with other services and allies was illustrated revealingly in response to a later question about Navy wartime operations in the Norwegian Sea. In partially censored testimony, the CNO equated the importance of the Norwegian Sea with that of the Mediterranean and declared that it had to be entered and controlled as soon as possible. "Probably the most effective way of doing this, in my professional judgment, is to . . . attrite and control that Soviet air [power] if possible, and destroy every Soviet surface ship as soon as possible. That should be possible to do both from land-based air and a US submarine force . . . so as to force them into a very defensive mode. . . . If you are successful in doing that, then I think you can talk realistically about putting

carrier forces, amphibious forces, and resupply . . . as freely as you must."

It is perhaps unfair to draw too much from one answer to one Congressional question, but the CNO seems to be saying that the carrier battle groups would not, in fact, lead the way into the Norwegian Sea. Rather, they would wait until land based air (USAF and NATO) had, presumably, struck Soviet base areas and inflicted severe losses on Soviet antishipping strike aircraft, and submarines had done the same to Soviet surface ships and submarines. Then the carriers could operate in the Norwegian Sea to screen the resupply effort to Norway. The statement is significant for two reasons: the authors have never heard a senior Navy official publicly describe in this detail how the Navy would operate in the Norwegian Sea, nor state that the carrier battle groups would not lead the fight. Perhaps the Navy's strategy *is* changing somewhat, and becoming more effective—at least as far as the Norwegian Sea is concerned—by becoming more realistic.

Still other innovative concepts are being addressed by some within the Navy and without. For example, the increasing vulnerability of Quick Reaction Alert (QRA) aircraft in Europe raises the possibility of a new naval mission that would directly bear on the central front situation. Today the US Air Force has a large number of strike aircraft (mostly F-4 Phantoms and F-111s) in West Germany and possibly elsewhere designated for the nuclear QRA mission. In the event of a conflict, these are "dedicated" aircraft, to be used only to deliver nuclear weapons *if* and *when* authorized. Until then, they remain immobile on the ground, useless to the theater commander for conventional warfare and vulnerable to Soviet conventional attack (although they are in shelters that offer limited protection). Obviously, US-NATO nuclear-capable systems, including these aircraft, have a high priority in Soviet attack planning.

Existing US (and NATO) attack submarines could take over the QRA mission through the use of Tomahawk missiles. These missiles can be launched from standard 21-inch (diameter) torpedo tubes, with minimum modification to the submarines. By putting the QRA mission to sea, the theater nuclear strike force becomes more survivable and at much less cost than producing additional aircraft to replace the aging F-4 and F-111, or developing and deploying a new ground-launched ballistic missile. Finally, the standardization of NATO submarine tubes offers the opportunity of providing the Tomahawk to other nations while the warheads can

remain thoroughly under US control through assigning two or three US Navy personnel to each foreign submarine. A final consideration is that the submarine-carried cruise missiles would be essentially immune to sabotage, guerrilla attack, and other forms of paramilitary seizure.

While new roles and missions are considered for the US Navy and Marine Corps, almost every day the size and hence potential capabilities of the Navy declines. While roles and missions *should* dictate what types of ships and how many should be constructed, in reality budget cycles, shipbuilding capabilities, development lead times, *and politics* determine which ships will be purchased. On a day-to-day basis, Navy and Defense planners must decide what types of ships should be bought next year and how many.

As shown in Table 3.2, the number of ships planned for the Navy in recent five-year plans has been steadily declining. When this trend is superimposed on another, that of ships actually built compared to those requested by the President and those actually funded by the Congress, then the outlook for the future is bleak.

For example, as Table 3.8 indicates, during the past ten years the President has asked the Congress for an annual average of 18.9 ships per year over the decade, but only an average of 14.5 per year have actually been constructed. This current shipbuilding rate can sustain a fleet of only 435 ships. But the situation is worse, for some ships are being retired from the active fleet at significantly less than 30 years. For example, in late 1979 two large amphibious transports, the *Charleston* and *Durham*, were transferred to the Naval Reserve Force, to be manned largely by reservists. At the time the ships were slightly over ten years old; such modern ships are considered to have an effective service life of some 30 years. In this environment, the current shipbuilding rate cannot even sustain a fleet of 435 ships (slightly less than the current active Navy strength).

This FY 80 shipbuilding request called for $6.17 *billion* to construct 15 ships, while the FY 81 request—as stated in mid-1979—asks $6.5 *billion* for 17 ships. The authors do not feel that this level of ship construction will continue. Note that the United States has built 17 or more ships in only two of the last ten years. Rather, the budgets of the next ten years will probably only permit building one-half the number of ships in FY 80 to 81, or seven or eight ships per year—in theory enough to support an active fleet of about 240 ships. In this context, the authors predict an active fleet of some 350 ships by about 1990 and perhaps only 250 in the year 2000.

TABLE 3.8
US Navy Shipbuilding Programs

FY	President's Budget	Authorized & Funded	Actually built or under constn.
1970	16	14	10
1971	14	15	15
1972	19	16	15
1973	20	10	8
1974	14	14	14
1975	30	22	22
1976	23	15	15
1977	16	15	15
1978	22	18	18
1979	15	13	13
Ten-year average	18.9	15.2	14.5
*Nominal size of Navy	570*	465*	435*

*Assuming 30-year ship service life as overall average

TOWARD THE FUTURE

While the future US Navy and Marine Corps will probably be smaller than they are now, relative effectiveness could be maintained by emphasizing advanced weapons and sensors for existing platforms, and more careful selection of future platforms. The value in larger numbers is the (1) ability to forward deploy individual units or groups in more areas, and (2) enhanced survivability because the destruction of a small number of units does not destroy the total capability, and surprise attacks are more difficult on a larger number of units.

Both considerations are important in determining the minimum requirements for numbers of combat ships, aircraft, and Marine units. The authors believe that the minimum has been reached with respect to several platform categories, such as aircraft carriers (i.e., 12 to 13 ships that permit a continuous, peacetime forward deployment of four flattops).

Considering the reduced total force levels of the 1980s and beyond, the current numbers of cruisers, destroyers, and frigates appear "adequate." But two conditions must be met to make them viable against future Soviet and Third World threats. First, existing ships must be upgraded, for example, with towed array sonars and ASW helicopters and second, an orderly replacement program must be developed *and adhered to*. From a qualitative viewpoint, some minimum number of Aegis ships must be procured, probably on the order of 18 (plus six nuclear cruiser conversions). If there is a reduction in carriers, the nuclear Aegis ships could form the nucleus of highly capable surface action groups.

Beyond Aegis ships, new construction should be limited to more effective ships than possible with frigate-size vessels of some 3,000 to 4,000 tons. For the near-term variants of the *Spruance* are the most feasible ships. On a longer-term basis advanced hull forms must be considered: the SWATH, which provides excellent stability (and hence sustained speeds) and large deck area for modular or aviation payloads, or the Surface Effect Ship (SES) for very high speeds (60-100 knots). Small prototypes of both hull forms exist; larger ships—on the order of 2,000 to 3,000 tons—must be started now to provide the SWATH and SES options for warships built in the 1990s and beyond.

A final surface warship that becomes a vital consideration of the Navy's future must be the V/STOL carrier. A large ship—including a 94,000-ton *Nimitz*—operating V/STOL aircraft is much more mis-

sion and cost effective than a smaller ship. However, there will be few if any large carriers built after the FY 80 ship. Sea-based V/STOL could provide a supplement for ASW, AEW, and over-the-horizon targeting, as well as possible attacks ashore. All will be required if the US Navy (and Marines) are to have an overseas role in a future that has increased Soviet at sea activities and Third World military capabilities.

It must be remembered that V/STOL is not an alternative to conventional carrier air, but a supplement simply because it is "saleable" to the Congress while additional large carriers are not, at least for the near-term future. Further, an effective V/STOL program for surface warships will lead to providing larger cruisers and destroyers with some V/STOL assault capability. (Here again, the SWATH and SES hull forms may be viable candidates for V/STOL carriers by the 1990s; preliminary designs of various sizes already exist.)

The submarine picture is less clear in the future. Both the strategic (Trident SSBN) and large attack (SSN-688) designs are becoming too unacceptable to too many persons outside of the Rickover-submarine community. Alternatives—including possible nonnuclear submarines—must be developed. It is hoped that more realistic and credible analysis will be undertaken to develop future force requirements than now exists. The current Administration program—one Trident SSBN and one SSN per year—will result in a rapid decline in numbers of both submarine types in the early 1990s and beyond.

The attack submarines as well as surface ships and patrol craft can be provided with major striking power with the Harpoon and Tomahawk missiles, both of which can be installed with minimum modifications to the platforms. The Harpoon (which can also be fired from aircraft) has a 60-mile range against surface targets, while the Tomahawk can deliver a larger payload against ship or shore targets several hundred miles away. The 1,000-pound conventional Tomahawk payload could also be used for future ASW and reconnaissance systems.

These weapons, possibly also launched from Air Force B-52s assigned to ocean surveillance, could significantly compensate for the shortfalls in platforms. Still another multi-platform weapon is the naval mine. Here again, Navy tradition has been to downgrade both offensive and defensive mining capabilities in peacetime, but their deterrent and combat potential can no longer be avoided.

Returning to ship platforms, the amphibious force will decline. Except for helicopter ships, little new construction can be expected or should be encouraged. Rather, commercial merchant ships should be acquired, especially roll-on/roll-off vehicle ships for the forward deployment and transport of Marine equipment. At the same time, the Air Cushion Landing Craft (LCAC) and new amphibious tractor programs will probably die, the sooner the better from a viewpoint of costs. Instead, the funding—both R&D and procurement—should be applied to vertical lift, helicopter ships, and improved Marine equipment for a smaller but more capable Marine Corps. Instead of the current three-division structure with 30 maneuver (rifle and tank) battalions, a more realistic structure might be 9 to 12 battalions that rotate forward deployments, plus another 3 to 4 battalions in the Atlantic and Pacific areas, organized into combat brigades for "administrative" or limited assault landings. The savings in Marine personnel and aircraft (described above) would fund equipment modernization (including advanced Harriers and later V/STOL assault aircraft).

Another major program that should be supported is containerized systems. Existing technology can provide containerized ASW and air-defense systems (sonars, helicopters, rapid-fire guns, and missiles) that can be rapidly installed in merchant ships and possible auxiliary ships for self-defense. This could alleviate the need for convoys, which are increasingly vulnerable to attack because of satellite detection, long-range submarine (and shore) launched missiles, high-speed aircraft, and mining when they arrive in the overseas port area.

A logical step beyond arming merchant ships would be to use merchant ships with containerized systems in place of some warships. For example, a modern merchant ship can carry perhaps 2,000 standard containers[30] at speeds of over 30 knots with transocean ranges. Could a future "warship" be a high-speed container ship with modular radars and towed array sonars, vertical launch missile "boxes," and containerized command, control, and accomodation spaces?

The ship procurements and related R&D postulated above will be expensive. While the Marine changes proposed can "pay for themselves" through reductions in total Marine Corps size and abandoning certain programs, such savings are not as readily apparent for the Navy.

Some "marginal" savings can be realized, however. The development of a V/STOL aircraft suitable for both the ASW/AEW and

Marine assault role is feasible.[31] Also, use of the *Spruance* hull, power plant, and other systems for all future "conventional" design warships would permit savings in design, construction, maintenance, and manning during the ships' 30-year lives. Building nonnuclear submarines for some missions could result in larger force levels for the same cost and reduced manning requirements.

Still, to even maintain the current Navy force levels in ships and aircraft, an increase in Navy funding will be required. Additional R&D should also be funded in view of the above proposals for several major advanced systems:

- Anti-sensor/C^3 systems
- SWATH ships
- Surface Effect Ships
- Containerized systems
- Advanced V/STOL aircraft
- Tomahawk ASW/reconnaissance missiles
- Nonnuclear submarines
- Advanced nuclear submarines

(Admittedly, most of the technology for the submarines already exists in the United States *and abroad.)*

The FY 80 budget provides approximately $6 billion for ship construction and conversion, $4 billion for naval aircraft procurement, and $4.5 billion for related R&D. An across-the-board increase of at least five percent is considered necessary in these categories.

Although the Carter Administration promised a three percent increase in "real" defense spending, this is not what it seems. First, most if not all of that increase will be taken up by personnel programs; second, the Navy is forced to plan at a seven percent inflation rate while the actual 1979 rate is well over ten percent.

In the long term, many of the savings noted above will come into play. However, in the near term an increase of $2 billion or more per annum will be required to build and operate a Navy and Marine Corps that will be viable in the 1980s and beyond. This amount of increase, at least over the next three years, will provide the increases noted above, especially in R&D and prototype platform and system procurement, and account for the real inflation. (Remember, ships that require four to eight years to build have an aggregate inflation of tremendous amounts.)

In the period of the 1980s and beyond, the ability of the United

States to use the seas will continue to decline unless changes in our policies and programs are forthcoming. In that period the United States will probably be more dependent on the uses of the seas for its political, economic, and military well-being than ever before in the nation's history. Related to this dependence, the 1980s will probably continue to see a continuation of the unprecedented peacetime thrust to the seas now being undertaken by the USSR while many Third World nations will continue to increase their relative military capabilities.

NOTES

1. In 1949, the Navy's leadership openly opposed the government's decision to concentrate on a military policy centered on strategic bombing at the expense of conventional naval forces, especially large aircraft carriers.
2. Now called Carrier Battle Groups. During January 1980 one of these carrier groups was dispatched to the Indian Ocean without replacement at the time.
3. The first such visit, in August 1979, was by an Echo II cruise missile submarine. The Soviet Navy regularly uses submarines as well as surface ships for "political presence" operations, while the US Navy tends to use surface ships almost exclusively for Third World port visits.
4. General Sir John Hackett, in his book *The Third World War—August 1985* (New York, Macmillian, 1978), predicts Egypt having a renewed military relationship with the USSR by 1984.
5. Indonesia, Malaysia, Philippines, Thailand, and Singapore.
6. In 1979 the large Aegis missile destroyer class was redesignated "cruiser."
7. The May became operational about 1969 and the Hormone in 1967.
8. For further discussion of this situation, see Norman Polmar, "Soviet ASW—Highly Capable or Irrelevant?" *International Defense Review*, May 1979, pp. 721-729.
9. Based on 12 submarines per year (10 nuclear + 2 diesel) with a nominal 25-year service life.
10. These are the *Spruance*-class ASW destroyers, former Iranian missile destroyers based on the *Spruance*, and Aegis-armed missile cruisers, all under 10,000 tons. The Soviet cruisers apparently range in displacement from some 10,000 tons to about 30,000 tons.
11. Gorshkov, a five-star officer, has the rank of Admiral of the Fleet of the Soviet Union.
12. An unusual and interesting evaluation of the Soviet military is found in Colonel Donald L. Clark, USAF (Ret.), "Who Are Those Guys?" *Air University Review*, May-June 1979, p. 47ff.
13. For example, see Fred Charles Iklé (formerly Director, Arms Control and Disarmament Agency), "What It Means to Be Number Two," *Fortune*, November 20, 1978, pp. 72-84.

14. Called Higher Naval Schools by the Soviets; *the* Soviet Naval Academy is the equivalent of the US Naval War College.
15. Clark, "Who Are Those Guys?"
16. Caution about such capabilities, and the Libyans' proclivities to employ them, no doubt have played a part in high-level US decisions to keep well away from the Libyan coast while conducting exercises and other fleet operations in 1979.
17. The total number of tanks in the US Marine Corps is 228 plus 123 in the two reserve tank battalions. Several Third World nations have several times that number of tanks in their inventories.
18. In European waters a large number of minesweepers are available from European NATO nations.
19. A misleading acronym for Light Airborne *Multipurpose* System.
20. See Lieutenant Commander Hans Saeger, FGN (Res.), "Tactical ASW: A Case for a Non-Nuclear Submarine," US Naval Institute *Proceedings*, August 1979, pp. 92-94.
21. Also, as noted below, the shortfall in carrier-based aircraft will support the rationale for nine operational carriers with three continuously deployed.
22. India, China, and other nations are probable buyers of advanced Harriers.
23. Formerly the "destroyer" DDG-47; an 8,900-ton, oil-burning ship based on the *Spruance*-class ASW destroyer design.
24. By comparison, in 1964, when the Vietnam buildup started, the Navy had 40 frigates, comprising just four percent of the active Fleet.
25. SWATH is an acronym for Small Waterplane Area Twin-Hull. It provides for two torpedo-like hulls that are fully submerged and support an above-water superstructure on small struts. The SWATH provides an extraordinarily high degree of stability and facilitates the streaming of minesweeper gear.
26. Currently the Navy has 12 active and two reserve carrier air wings, and the Marine Corps has three active and one reserve wings.
27. The P-3 Orion was adopted from the commercial Lockheed Electra design.
28. Designated a Marine Amphibious Force (MAF).
29. Quoted in *Aviation Week and Space Technology*, March 20, 1978, p. 22.
30. Each 8×8×20 or 40 feet.
31. The Navy previously called this aircraft the Type A V/STOL design.

4.

General Purpose Forces: Army and Air Force

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INTRODUCTION

Despite the awesome nature of strategic nuclear forces, GPF are the most pervasive and costly element of the armed forces of any nation, including the predominant nuclear weapon states—the United States and the Soviet Union. Of the $135.5 billion in defense expenditure proposed by the Carter Administration for the FY 80, $50.0 billion was directly allocated to General Purpose Forces.[1] In addition, substantial portions of other accounts such as airlift and sealift forces, intelligence and communication, Guard and Reserve forces, central supply and maintenance, training, and other mission areas involved further expenditure in support of the US GPF posture.

GPF are spread between the three services, including the Marine Corps. Although this paper will not address specifically the subject of Navy and Marine Corps GPF, they have played (and will continue to play) an important role in the strategy of employment of GPF in the United States for more than a century. Unlike many nations of continental Europe, e.g., Switzerland and Yugoslavia,

who have evolved a well-developed strategy of territorial defense, the United States relies on mutual security agreements with friendly foreign nations and the ability to deploy expeditionary forces in support of its interests anywhere in the world.[2] Such a strategy requires relatively large-scale standing forces and a considerable investment in a wide variety of equipment suitable to all tactical environments, as well as an advanced mobility capability.

The costs of maintaining a credible GPF structure have increased markedly over the past decade because of the asymptotic character of incremental improvements to current force structure (i.e., in the absence of revolutionary technological change, small increases in performance require a large increase in cost), the high cost of operating large-scale mobile forces (of which fuel costs are but one widely understood example), and the high cost of competition for military personnel in the civilian economy.[3] The very nature of the defense programs of most Western countries, including the United States, makes it inevitable that defense costs will outrun nondefense inflation estimates. The notion of achieving security with small forces through an emphasis on "technical superiority" assures that the United States will be obliged to pay substantially more in the unit cost of defense equipment procured to achieve relatively modest gains in performance than would be the case if we relied on "simple" equipment and large-scale procurement. This is not to say that GPF are immune from major technological change that could serve to reduce cost; on the contrary, many of the tasks now routine to GPF of virtually every army would have been infeasible in the absence of major technological advance.[4] However, the requirement to hold or acquire territory requires forces with characteristics that vary little from army-to-army. The manner in which the forces are organized and the tactical doctrine that directs their employment will assume an ever larger role in the effectiveness of GPF as the likelihood for a "technical revolution" fades from the realm of likely possibility.

This paper will review elements of the Soviet military threat pertaining to the conduct of land warfare and its related component, tactical airpower. Against this characterization of the Soviet military threat will be arrayed the programmatic response embodied in defense budget for US GPF. In particular, major policy initiatives of the current Administration intended to address some of the central elements of the Soviet military threat they perceive will be discussed. Two dimensions of the US GPF posture will be reviewed that tend to include many of the major substantive issues

facing US defense planners in organizing an adequate response to the Soviet threat. These two areas are the modernization of US theater nuclear forces and the question of the development of an adequate reserve force capable of responding to a major military contingency.

THE SOVIET THREAT

Military Doctrine

The Soviet armed forces constitute a unique military establishment. Not only are its armed forces organized in a manner that differs from any of their Western counterparts, but also the doctrine that directs the employment of these forces differs substantially even though it has borrowed extensively from Western models.[5] The organization and doctrine of the Soviet Army is most heavily influenced by its World War II experience, but it has tempered that experience with the assimilation of modern military technology, particularly nuclear weapons and modern electronics to revise continually their military doctrine to reflect these changes. Perhaps the most compelling lesson the Soviets learned in the years following World War II was the issue of combined arms operations. Indeed, the central problem of theater warfare from the Soviet perspective is how it shall coordinate its "combined arms," namely its tank/antitank units, mechanized infantry, artillery, and tactical air power.[6]

Soviet land warfare doctrine is dominated by the need to take the offensive. Soviet forces rely heavily upon massive (tube and missile) artillery and tactical air-delivered suppressive terrain fire to breach prepared defenses that will be exploited by Soviet mechanized formations including both tank divisions and motorized rifle divisions.[7] The prolific use of nuclear weapons and fully mechanized and echeloned combat formations permit a relentless round-the-clock high speed of advance.

Over the course of the past decade, and particularly since the Arab-Israeli conflict took place, the Soviets have sought to adapt their forces to the conditions of changing technology, particularly as it pertains to their ability to operate their large-scale mechanized formations in the modern battlefield. This requirement has led to a lively and intense debate among Soviet professionals about the appropriate means of response, and, as a result, there have been a number of proposals advanced to make important tactical changes in the manner in which Soviet ground forces oper-

ate.[8] Nevertheless, there has been an underlying constancy to the Soviet military doctrine as it pertains to theater warfare. Soviet forces continue to contemplate the employment of "all" means of attack under circumstances of general war (including nuclear, conventional, chemical, and paramilitary). Soviet ground forces are protected from air attack by organic division level air defense that provides a complete overlapping envelope of protection from very low to very high altitudes both forward of the immediate area where their forces are engaged, as well as to areas deep in the rear area of the Soviet division, army, or front engaged in combat.[9]

Soviet forces are keyed to high rates of daily advance, requiring not only the massive concentration of artillery and tactical air power at the point at which penetration is made, but also through the complete mechanization of the Soviet armed forces including both tank and motorized rifle divisions and the development of specialized equipment for Soviet airborne forces giving them a substantial mechanized capability. These massive concentrations of military power associated with the Soviet deployment of forces in Europe are related to the Soviet doctrinal requirement for an around-the-clock offensive with tactical surprise (i.e., without the prior mobilization of Soviet reserves) to crush the forces of an adversary before he can bring to bear his operational reserves.[10] The emphases of Soviet military doctrine have led to the successive introduction of an entirely new tank design, the T-64/72, the first new Soviet tank since the post-World War II era tanks (T-54/62); the introduction of an infantry-fighting vehicle, the BMP *(Boevaya mashina pekhoty)*; the inclusion of larger-scale organic air defense for the Soviet division; the introduction of theater nuclear weapons; and the transfer of a major fraction of the air defense function from Soviet tactical air forces to ground forces and the shift in emphasis within Soviet tactical air forces to ground attack.

A more recent innovation has been the introduction of the extensive use of helicopters in the transportation as well as attack roles. The introduction of the helicopter to combat operations is a relatively new phenomenon in the Soviet armed forces, although they have been employed in transport operations for many years.[11] The primary combat helicopter, the Mi-24 *Hind* (deployed in two variants, the "A" and "D" versions) has an attack and transport capability. It can carry 8 to 14 troops as well as a variety of antitank weapons and bombs. Its main rotor, a five-bladed system with a stabilization system facilitates operation in a high-turbulence en-

vironment. Three *Hind* regiments are currently deployed with the Group of Soviet Forces in Germany (GSFG) at Stendal and Parchim with 100 to 200 helicopters.[12] The primary modes of employment are with a reinforced motorized rifle regiment and with the Special Duties Brigade *(Brigada Osobovo Nazracheniya)*—2,000 troops in four battalions of Soviet airborne forces, assigned to carry out raids and special missions.

Soviet Logistics and Military Airlift

The debate in the United States about the readiness of the Soviet Union for protracted conflict in Europe gave rise to the "long war–short war" controversy. In the main, the details of this controversy turned on perceptions of the adequacy of Soviet logistics to support protracted conflict with its armed forces. Indeed, logistics have never been a strength of either the Czarist or the Soviet Army. However, the Soviets have recognized that they have a serious potential limitation in the ability of their forces to operate in the absence of an effective system of logistic support.[13] Figure 4.1 shows the estimated divisional requirements for combat consumables, particularly ammunition and fuel. From these divisional estimates one can extrapolate the requirements of a front to be 25,000 tons per day or more and 300,000 tons for a 12-day campaign. Since the early 1970s, equipment assigned to the front has increased more than 20 percent, so it is likely that the front daily requirement could exceed 30,000 tons per day and the requirement for a 12-day campaign could exceed 400,000 tons.

C.N. Donnelley, a British specialist in Soviet affairs, estimates that 500,000 tons is a more realistic estimate of the requirements of a front for a 12-day campaign.[14] Requirements such as these are a formidable one to the Soviet Union with only a modest civilian infrastructure for transportation. As a consequence, the organization of the Soviet logistics system has been a particularly difficult one for Soviet commanders. In recent years, the Soviet Union has attempted to minimize the amount of logistics of infrastructure required by uploading fuel and ammunition with deployed forces. GSFG has more than 30 days supply of fuel and ammunition uploaded with its tank and motorized rifle divisions to reduce the burden on the logistics infrastructure at a time of crisis. Moreover, as an added benefit to the Soviets, the uploading of such fuel and ammunition reduced the warning time available to NATO because of the lack of movement of fuel and ammunition that would have otherwise accompanied the Soviet plans for a surprise attack.

FIGURE 4.1
Divisional Estimated Requirement Rates Daily (Tons)
(Average for First-Echelon Divisions)

	Opposed or major axis		Unopposed or minor axis		Average		
	Ammo MR/TK	Fuel MR/TK	Ammo MR/TK	Fuel MR/TK	Rations MR/TK	Spares MR/TK	Totals MR/TK
Attack	420/396	564/504	280/264	376/336	28/24	100/55	1,112/979 Max. 784/679 Min.
Defense	564/504	300/276	370/336	200/184	30/26	75/45	969/851 675/591
Pursuit	66/63	852/780	44/42	568/520	19/15	50/30	987/888 681/607
Reserve	132/120	216/192	88/80	144/128	24/21	35/23	407/371 295/252

SOURCE: International Defense Review, Volume 12, No. 3, p. 347.

MR = Motorized Rifle Division

TK = Tank Division

The relatively small size of Soviet divisions does not permit the extensive support infrastructure that exists in US divisions. However, the Soviets have assigned logistic requirements to every unit of command. The basic principle involved is that it is the responsibility of higher commands for the delivery of supplies to lower, rear-area elements. Thus, it is the Soviet division that has the responsibility for moving supplies to Soviet regiments and battalions. Similarly, it is the Army that has the responsibility to supply division logistics depots and the front that has the responsibility to supply Army logistics requirements. A Soviet motorized rifle division has 3,700 tons of organic lift capability in its indigenous transportation battalions, while an armored division has approximately 3,400 tons.[15] These figures can be expanded if civilian transport is commandeered—a central feature of Soviet doctrine.

Since 1969, there has been a six-fold increase in mechanical handling capability of the Soviet Army. The oil pipe-laying facilities under construction for some years are now operational and able to support Soviet operations in Eastern Europe at a high level of combat intensity. Most Soviet logistics vehicles are now pressurized to permit operations in an environment where there are chemical aerosols or nuclear-contaminated particulates that would otherwise bring a major logistics effort to halt. This attention to details of chemical warfare operations is a substantial difference

between the practices of the Soviet Army and those of the United States and NATO. With the complete mechanization of the Soviet armed forces in the early 1960s, there has been a great attendant increase in the requirement for fuel in combat operations. It is estimated that at least 50 percent, and perhaps as much as 75 percent, of the tonnage requirement for a Soviet division engaged in combat will be accounted for by fuel requirements. Recognition of this vulnerability has caused the Soviets to invest heavily in fuel-handling equipment and portable rubber fuel reservoirs. The latter development makes it possible for the Soviets to emplace fuel dumps quickly at areas where they will do the most good from the perspective of the operation of a unit engaged in combat. The use of rubber fuel reservoirs has enabled some Soviet vehicles to carry as much as 12 times the amount of fuel in these reservoirs as they could have formerly carried in cans or drums.

Soviet airlift known as Military Transport Aviation (*Voyenno Transportnaya Aviatsiya*—VTA) has assumed a larger role as Soviet international interests evolved. The Soviet support of Cuban forces and the Soviet client government in Ethiopia in 1977 as well as the 1979 Afghanistan invasion are important indicators of the direction of the VTA, namely to provide the Soviet Army with an advanced tactical and strategic airlift capability. The VTA (as a counterpart to the USAF Military Airlift Command) is far more integrated with its civilian counterpart, *Aeroflot*, than is MAC with US civil aviation. *Aeroflot* is under the command of a Soviet Major General and the two organizations use identical aircraft, although the military versions have minor modifications (e.g., the tail-mounted twin AM-23 guns in the militarized version of the IL-76). Soviet VTA aircraft outnumber their civilian counterpart by a ratio of more than 3:1 (1,390 aircraft assigned to the VTA versus 395 to *Aeroflot)* as shown in Figure 4.2.

Soviet VTA aircraft have three design characteristics that distinguish them from their US counterpart.[16]

1. *STOL Operation.* Although most US military airlift aircraft are designed for conventional improved runways, Soviet aircraft have a substantially higher power-to-weight ratio than their Western counterparts giving them a superior short field capability.
2. *Unimproved Runway Operation.* The dependence of the Soviet civil sector on air transport to remote areas has compelled greater emphasis on operation from unimproved runways. Only

FIGURE 4.2
VTA and Aeroflot Transports

	Maiden flight	Entry into service	No. in service	
			VTA	Aeroflot
An-26	1968	1969	600	160
An-32	1976	1977	--	22
An-72	1977	1980?	--	2
An-12	1956	1959	650	150
Il-76	1971	1975	100	25
An-22	1965	1967	40	36
Total			1,390	395

SOURCE: International Defense Review, Vol. 12, No. 6, p. 949.

the C-5A and C-130 series currently in service can operate from unimproved runways. All Soviet transport aircraft are equipped with short landing gear undercarriages and low pressure tire systems permitting operations from poor unimproved landing strips.

3. *On-board Ground Support.* The lack of an array of efficient ground handling equipment has encouraged the search for other solutions by the VTA. Soviet airlift aircraft are equipped with overhead conveyers and hoists built into the load-bearing structure of the aircraft itself. Soviet aircraft are also equipped with both pressure and gravity refueling systems and on-board test equipment and an auxiliary power unit (to test electrical and hydraulic systems and to start engines without ground equipment). These measures render Soviet airlift far more independent of local material handling facilities than their MAC counterparts.

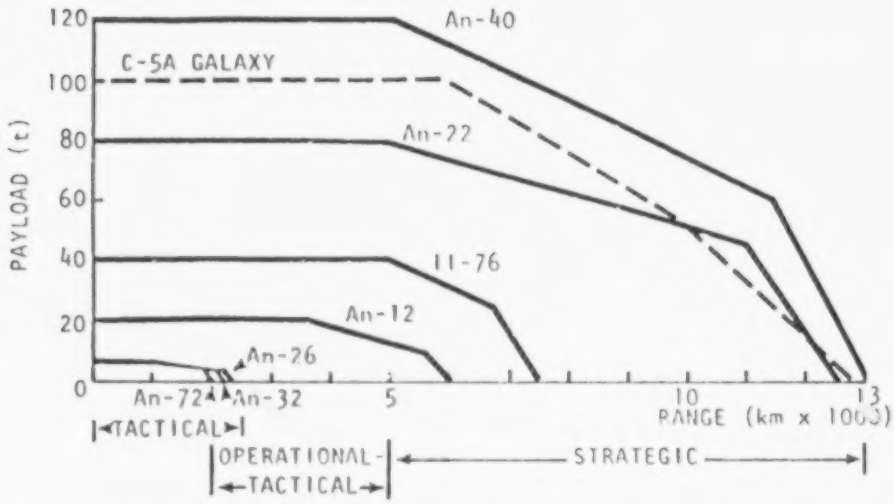
The development of three new types of transport aircraft including the wide-bodied IL-86, the STOL AN-72 (extraordinarily similar to Boeing's YC-14 aircraft), and the prospective C-5A-class AN-40 point to continued efforts on the part of the Soviets to improve their airlift performance in terms of both range and payload. Range–payload curves are shown in Figure 4.3.

Until recently, the VTA's role was limited primarily to tactical airlift for the eight Soviet (7 operational, one training) airborne divisions. A modest strategic airlift capability was provided by the 40 AN-22 *Cock* aircraft in the VTA inventory (an additional 45 aircraft are assigned to Aeroflot). The widespread attention now being devoted to support operations, particularly logistics and airlift operations, suggests that the Soviets will have an enhanced ability to support their forces, whether on the Eurasian land-mass, or in other areas, for an extensive period of time. In nearby areas, such as the Persian Gulf, this is a particular problem because Soviet airlift assets could deploy up to ten Motorized Rifle Divisions now deployed in the Trans-Caucasus Military District in the time required to airlift a single Mechanized Infantry Division into the Gulf. The absence of a capability of the United States to deploy specialized units for low-intensity operations (e.g., note that more than 100 aircraft were required to support the deployment of a single squadron of unarmed F-15s from the United States to Saudi Arabia in December 1978) may prove costly in the event that an opportunity arises from the Soviets to exploit their airlift assets.

Developments in Soviet Tactical Aviation

Tactical airpower has assumed an ever-increasing importance in Soviet military operations as the ability of the Soviets to produce high performance in large numbers has expanded since the late 1960s.[17] Known as Frontal Aviation *(Frontovaya aviatsiya)*, it is organized in a manner quite different from its Western counterparts. The Soviet Air Force is organized into four main components, the Air Defense Forces (PVO-Stranny—*Protivo Vozduschniya Obarona Stranny)*, Long-Range Aviation (DA—*Dalniya Aviatsiya)* and the Air Transport Forces (VTA—*Voenno Transportnaya Aviatsiya)*, Naval Aviation (AVMF—*Aviatsiya Voenno Morskava Flota)*, and Frontal Aviation. Unlike their American counterparts, each of these branches are under separate command with a separate command structure with clearly defined roles and missions. The Soviet Frontal Aviation Forces are operationally under the command of the Soviet Front Commander in time of war

FIGURE 4.3
Payload/Range Performance of Soviet Transports



SOURCE: INTERNATIONAL DEFENSE REVIEW, VOL. 12, NO. 6, P. 949.

reflecting closely the Soviet concept of combined arms operations *(organizatsiya nepreryvnogo vzaimodeistviya)* where all elements of the land warfare battle, including armored vehicles, artillery, mechanized infantry, and tactical airpower, are integrated into the scheme of Soviet ground forces operations in an integrated manner. The nature of the Soviet command structure that gives preeminence to the ground force commander tends to reduce problems that occur in other Air Forces of excessive attention being focused on the ability of the Air Force to conduct autonomous operations to achieve military objectives rather than being carried out in concert with ground forces in a combined arms mode.

Soviet Frontal Aviation units are organized into several Frontal Aviation armies, one allocated to each of 16 military districts and 4 groups of Soviet forces deployed outside of the Soviet Union. There is a considerable degree of variability in the strength of each of the air armies *(Vozdushnaya armiya*-VA) owing to their geographic location and strategic importance. Typically, each VA has 300 aircraft deployed in three to four aviation divisions. Each division is composed of three regiments, each composed of several

squadrons *(eskadril'ya)* of from 10 to 24 aircraft. Each squadron is further organized into several flights *(zveno)* depending upon the type of aircraft organic to the units.[18]

Overall, there are 5,000 combat aircraft assigned to the VAs with an additional 3,000 in reserve. The largest VA, the 16th VA in East Germany, is deployed with the GSFG. The Soviet VAs get additional support under appropriate tactical circumstances from other branches of the Soviet Air Force. The most significant changes the Soviet Frontal Aviation units have undergone in recent years, occurring as a consequence of changing the ability to assign the burden of air defense to the ground force units themselves, have freed considerable numbers of aircraft in the Frontal Aviation units—otherwise required for the air defense of ground forces—to enable them to assume a greater role in ground attack mission. This change has of course been facilitated by the introduction of more capable aircraft, particularly those with greater payload capability and longer range.[19] This has been exemplified by the addition of the MiG-23/27 *Flogger* series into the inventory of Soviet Frontal Aviation units. This versatile aircraft has spawned a family of variants for the interceptor, reconnaissance, and ground attack role.[20] The MiG-23/27 is likely to form the backbone of the Soviet Frontal Aviation ground attack and interceptor capability for some time to come. In addition, it appears that a modified version of the MiG-27 may be developed for use in the naval role with Soviet naval aviation units (AVMF) as a carrier-based aircraft for a forthcoming generation of Soviet aircraft carriers capable of employing aircraft in the conventional take-off and landing role (CTOL).

The changing tactical employment of artillery has further changed the role of Soviet tactical airpower.[21] Soviet artillery has tended to deemphasize its prior focus on pre-planned area fire missions in favor of artillery attacks on time-sensitive targets. Preplanned attacks are now the province of Soviet tactical airpower in concert with Soviet ballistic missile strength deployed well behind the forward edge of the battle area (FEBA). Further, emphasis on the meeting engagement, rather than the massive breakthrough type of operations formerly discussed in the Soviet literature creates additional opportunities for Soviet Frontal Aviation in the deep strike ground attack role as well as attacks against mobile targets.

The primary role of Soviet Frontal Aviation in Europe, however, is to reduce the sortie rate of US/NATO aircraft. With the widespread use of nuclear weapons, this could be carried out by the

medium and intermediate range ballistic missiles in the possession of the Soviet Strategic Rocket Forces (*Raketnye Voiska Strategicheskogo Nazacheniya*, Rocket Troops of Strategic Designation including systems with a range in excess of 1,000 km.). However, Soviet doctrine envisions a potentially protracted nonnuclear phase in a future conflict, which suggests that in the future a much greater role would be assigned to Frontal Aviation units to suppress the US and NATO aircraft deployments in Western Europe as a means of reducing their sortie rate.[22]

Soviet Theater Nuclear Forces

As is the case in many other aspects of warfare, there is a substantial difference between the Soviet and US view of theater nuclear warfare.[23] The Soviet Union perceives theater nuclear warfare as an integrated element of their entire theater defense posture rather than a separate component of their defense policy. In examining the Soviet theater capability, one must look at a continuum of forces that can be classified in Soviet parlance in four categories or levels of conflict.:

1. *Tactical* forces that involve in what is known in US parlance as GPF, excluding those with a nuclear mission.
2. *Operational tactical* that corresponds to the US/NATO notion of theater nuclear forces.
3. The category known as *Operational Strategic* forces is one for which there is no immediate parallel for the US/NATO case. In particular, the Soviets view operational strategic forces as those forces capable of conducting theater missions even though they are launched from the Soviet Zone of Interior, and in some cases could have what the United States describes as a strategic mission (e.g., the TU-22M *Backfire*).
4. The latter category of *strategic* forces corresponds directly to the US concept of strategic forces implying intercontinental delivery capability, including land-based ballistic missiles, manned bombers, standoff cruise or ballistic missiles, and submarine-launched ballistic or cruise missiles.

For many years, it was something of a cliché to assert that the United States had 7,000 theater nuclear weapons deployed in Western Europe and the Soviets had a very modest number by comparison. While this may have represented reality some years ago, the steady if unspectacular annual growth of Soviet theater

nuclear force capability has had a cumulative effect on their deployments in Eastern Europe. The Soviets can now deliver nuclear weapons from a variety of theater-level ballistic missiles, including the *Scud* B (280 km range), the SS-12 *Scaleboard* (750 km range), the FROG-7 free rocket (60 km range), and a variety of tactical aircraft all capable of being deployed in the theater. In addition, the Soviets have deployed in the Western military districts of the USSR the SS-4/5 intermediate and medium range ballistic missiles, the TU-16 *Badger* and TU-22 *Blinder*, as well as the TU-22M *Backfire* bomber. More recently, the highly capable SS-20 (3 MIRVs) has been deployed in the Western Military Districts of the USSR and the Soviet Far East in considerable numbers. The Soviet Union is undergoing a modernization program for its short-range theater ballistic missiles as well, including the SS-21 and SS-22 theater ballistic missiles that will enhance the capability of the currently deployed FROG-7 and SS-12. A subsequent development, the SS-23, will probably augment if not replace the *Scud*. The recent conversion of the Soviet M-1955 203 mm howitzer to a self-propelled version (M-1975) will likely improve the artillery-delivered capability of the Soviets in the theater nuclear field as well.[24] This is particularly important because of the widely perceived vulnerabilities of towed artillery. The prior reliance of the Soviet Union on towed artillery exposed their batteries to devastating counterbattery fire, a major lesson of the 1973 Arab–Israeli conflict. The Soviet M-1974 152 mm self-propelled howitzer was converted from the M-1955/D-20 towed version for the same purpose. The self-propelled 152 mm howitzer is organic to all divisions deployed with the GSFG, although it is not believed to have a nuclear capability.

Perhaps the most important dimension of difference between Soviet and US tactical nuclear forces relates to the difference in range capability of the bulk of the two opposing forces. The US theater nuclear delivery systems reflect US attitudes toward theater nuclear weapons, i.e., they are in large measure designed for their political effect rather than their overt military effect. That is, the US strategic doctrine as it relates to deterring war in Europe has designated theater nuclear forces as being a means of coupling US strategic nuclear forces to the deterrence of a Soviet attack on Western Europe. The use of theater nuclear forces by the United States has been perceived of as a means of providing a persuasive political demonstration of resolve and intent to deter subsequent escalation.[25]

The Soviets, on the other hand, have developed their theater nuclear forces primarily for their military effect.[26] This is to be expected in view of the manner in which Soviet theater warfare doctrine has evolved where "all means" of attack are assumed in the event of a general war in Europe. Soviet doctrine envisions nuclear weapons as the major contributor to maintaining a rapid rate of advance and thus is integral to the Soviet concept of military operations. This included the expectation that nuclear weapons would be used from the outset, although this has been more recently modified by statements in the Soviet military literature, to occur after a possibly protracted conventional phase. As a result of the Soviet focus on the military effectiveness of theater nuclear weapons, the Soviets have developed a family of weapons that are capable of long-range attack, the attack most appropriate to the target structure they face. Soviet forces are typically directed at nuclear delivery systems, weapon storage facilities, command control centers, major troop concentrations, reserve forces, and lines of communications.[27] Such a set of targets requires relatively long-range delivery systems such as those delivered by tactical air power and delivery systems, particularly tube artillery. However, the increased emphasis on self-propelled artillery, and the probability that the Soviet 203 mm. self-propelled artillery is nuclear-capable, may presage greater emphasis on nuclear strikes close to the FEBA, perhaps including nuclear use in a meeting engagement scenario. Heretofore, the expectation was that nuclear weapons employed near the FEBA would be primarily associated with attacks against prepared defenses in the breakthrough phase of Soviet ground force operations.

It has long been assumed that the yield of Soviet theater nuclear weapons is quite high (100 kt-1 MT), a conclusion derived not so much from direct evidence as from an estimation of the very high payload capabilities of some Soviet delivery systems, particularly ballistic missiles. However, the Soviets have a powerful incentive to diminish the scope of destruction in Western Europe, an objective that can be obtained by the employment of somewhat lower yield weapons than is currently attributed to them by US and NATO analysis, and the greater use of air bursts rather than surface bursts for attacking NATO targets. The use of lower yield weapons and selective targeting of nuclear strikes at optimum burst altitudes (to maximize blast damage and minimize local fallout) could permit the Soviets to attack a large fraction of major NATO targets with "modest" casualties among noncombatants, thereby making it easier to use nuclear weapons in a conflict.[28]

Soviet long-range theater nuclear forces pose a grave threat to the ability of the NATO alliance to survive a conflict because of the enormous potential these forces have for the destruction of military targets, even more so, for the potential destruction of civilian targets. This problem is one that has been too little addressed in the NATO context in particular because of the overwhelming emphasis in the past on deterrence of nuclear conflict in Europe rather than addressing the issue of the means by which NATO would cope with a failure of deterrence. One possiblity that is almost unexplored in its political dimension is the introduction of antitactical ballistic missiles in Western Europe perhaps on a *de facto* basis. In part, this is an outgrowth of the increasing requirements for high-performance air defense systems that require high powered radars, advanced signal processing, and high acceleration interceptors. As a consequence, although upgraded air defense systems are not adequate for the strategic ballistic missile defense role, they appear to be adequate for the tactical ballistic missile role because of the relatively slow speed of re-entry, the large radar cross section, and the potential density of high performance air defense systems in Western Europe. The introduction of the Soviet SA-10 air defense system in Eastern Europe could provide a rather effective terminal defense of fixed targets against the modest number of NATO ballistic missiles in Western Europe.[29]

US GENERAL PURPOSE FORCES

A major emphasis in the defense program of the Carter Administration has been to improve the capability and readiness of US GPF. This intent to improve the capabilities of US GPF has, however, been made within the context of a budget limitation rather than being measured against the magnitude of the overall Soviet threat. In May 1977, President Carter made a commitment to the NATO nations that the United States would increase its defense expenditure at an annual rate of three percent above the nominal rate of inflation. It was expected that the NATO nations would emulate the American example.[30] The technique of employing an expenditure ceiling as a means of formulating defense policy is one fraught with hazards. There are at least two important deficiencies. First, the technique fails to take account of the consequences of the cumulative period of defense shortfalls in previous years on the part of the United States. Indications suggest that the Soviet Union has expanded more resources on defense in the past decade than the United States; indeed, a recent RAND Corporation

study suggests that the Soviet Union has outspent the United States by approximately $100 billion since 1973.[31] Second, such a technique overlooks the fact that even under optimistic assumptions about future US expenditure, there appears to be a fairly substantial chance that the Soviet Union will be investing more resources on defense than the United States for decades to come. Assuming the median CIA ruble estimate for Soviet defense expenditures (50 percent greater than the United States), growing at a four percent annual rate, and that the United States elects to increase its real growth in defense expenditures at a rate of five percent, US defense expenditure will not catch up to the Soviets' until the year 2022. This is hardly sufficient to have the desired military effect much less a diplomatic one save encouraging the image of Soviet preponderance in Europe.

Nevertheless, the Carter Administration has made a number of proposals in its FY 80 budget submission that will have the effect of modestly improving the military capability of American forces even if such improvements are inadequate to meet the magnitude of threat.[32] The programmatic changes that the Carter Administration has proposed for the US GPF posture are focused in six major categories:

1. Improving the early combat capability of US forces against the Warsaw Pact threat.
2. Improving the rapidity of response to a Warsaw Pact confrontation.
3. Improving US field-air defense capabilities.
4. Enhancing the ability of US forces to sustain protracted combat operations.
5. Improving the capability of US forces to operate in an electronic warfare environment while sustaining high quality command-control-communications and intelligence activities essential to the maintenance of sophisticated combat operations.
6. Enhancing the capability of US forces to withstand a chemical or biological warfare attack and retaliate with chemical weapons.

The Enhancement of Initial Combat Capability Against Warsaw Pact Forces

The ability of US forces to operate in the early stages of a conflict against Warsaw Pact forces has been a major shortcoming of

the US forces deployed in Europe. This is due less to the decline in capability of US forces (owing to a reduced pace of investment) than it is to the increased capability of Soviet forces to conduct a large-scale unreinforced attack in Western Europe as a result of the maturation of their force modernization effort underway since 1968.[33] The current US Order of Battle of its ground forces is shown in Figure 4.4.

To improve the capability of US forces to provide more intense artillery fire against deployed Warsaw Pact units, US artillery battalions deployed in Europe and US-based battalions scheduled for early deployment in Europe have had each of their three batteries configured with eight howitzers instead of the existing six. This step will only partially offset the increase in Soviet artillery strength in the GSFG accumulated since 1970. The Soviets currently have an inventory of more than 20,000 artillery pieces compared to less than 6,000 for the United States.

The increase in the number of maneuver battalions in early deploying US-based divisions has been increased by seven heavy battalions and the Administration suggests that it intends to increase the number by two in the course of the FYDP. To reinforce the weakest portions of the NATO deployment on the Central Front, the United States has deployed an Army brigade to the Northern Army Group (NORTHAG) in the northern part of Germany. This area, opposite the Soviet Third Shock and First Guards Tank Armies in East Germany, stands athwart a major Soviet objective, namely the shortest route to the port cities in the Benelux nations. It is virtually certain to be a major conflict area in the event of a general war in Europe.

Perhaps the most comprehensive effort made by the Carter Administration to improve the capability of US GPF for land warfare relates to the modernization of equipment for close combat operations. The most important dimension of the program involves the modernization of US tracked fighting vehicles, particularly the introduction of the XM-1 tank and the production of a new armored personnel carrier known as the Infantry/Cavalry Fighting Vehicle System (XM-2/XM-3). The US Army tank inventory is now less than 12,000 units in FY 80 including reserve and obsolescent units (compared to over 50,000 in the Soviet active inventory alone), but this figure is scheduled to increase to more than 16,000 units as the XM-1 tank is introduced into the US inventory during the course of the decade. In addition, the M60A1 series tank is being product-improved through the addition of a laser range finder and a ballis-

FIGURE 4.4
Land Forces: US Order of Battle (FY 80)

U.S. Army

- 4 Armored Divisions
- 6 Mechanized Infantry Divisions
- 4 Infantry Divisions
- 1 Airborne Division
- 1 Air Assault Division
- 4 Infantry Brigades
- 3 Armored Cavalry Regiments
- 1 Armored Brigade
- 1 Cavalry Brigade (Air Combat)

Reserve Brigades

- 10 Infantry
- 3 Armored
- 7 Mechanized Infantry

Round Out Units (Reserve)

- 2 Mechanized Infantry Brigades
- 2 Infantry Brigades
- 6 Armored Battalions
- 4 Mechanized Battalions
- 1 Infantry Battalion

National Guard

- 2 Armored Divisions
- 1 Mechanized Infantry Division
- 5 Infantry Divisions

U.S. Marine Corps

- 3 Infantry Divisions
  (plus armor, artillery and tactical aircraft)
- 1 Infantry Division (Reserve)

Non-Continental U.S. Deployments

Europe

- 2 Armored Divisions
- 2 Mechanized Infantry Divisions
- 2 Armored Cavalry Divisions
- 3 Forward Deployed Brigades
- 1 Infantry Brigade (Berlin)

Korea

- 1 Infantry

Other Areas

U.S. Army

- 1 Infantry Division (Hawaii)
- 1 Infantry Brigade (Alaska)
- 1 Infantry Brigade (Panama)

U.S. Marine Corps

- 1 Infantry Division (Okinawa)
- 2 Brigades
- 1 Brigade (Hawaii)

tic computer to improve substantially its performance, making it equivalent to the M60A3 models currently in production. Initial production of the Infantry/Cavalry Fighting Vehicle began in FY 79 and continues in FY 80 with the procurement of 174 units, with 246 units programmed for FY 81 procurement. Additional procurement of the TOW antitank missile is continuing in FY 80 and will continue in FY 81. However, it has been revealed that the T-72 tank currently deployed in large numbers by the Soviet Union, and already in the hands of several of the Soviet client states in the Middle East, may render US and antitank missiles unable to penetrate its newly discovered composite armor at operational ranges. As a consequence, the urgent development of a new generation of heavy antitank missiles as well as a new doctrine for their use in modern combat may be necessary.

The modernization of Army tactical air support, particularly heliborne fire support, is also in an advanced stage of modernization.[34] The Advanced Attack Helicopter (AAH), currently under development, is scheduled for its initial procurement in FY 81. The modernization of the currently deployed *Cobra* AH-1 attack helicopter is being carried out with the introduction of TOW missiles to the *Cobra* to provide it with a modern antitank capability (AH-1S).

A new helicopter (UH-60A *Blackhawk)* for the tactical transportation of the Army has been in procurement since FY 78 and 145 units are being procured in FY 80 with further procurement scheduled for later years in the decade for a total of 1,107 helicopters. The combat environment in Western Europe is likely to make helicopters a somewhat less ubiquitous means of transportation than they were in the Vietnam conflict, but the widespread introduction of helicopters in the Warsaw Pact armies, particularly the MI-24 *Hind-D* helicopter in the Soviet inventory, assures their continued place in modern warfare, even under circumstances of intense conflict. Some recent evidence suggests that the Soviets may eventually abandon their approach of a dual-purpose attack/transport helicopter and emulate the US practice of dedicated attack, transport, and observation helicopters.

A further element under modernization proposed by the Carter Administration has been the improvement of missile artillery support for US forces. The introduction of the *Lance* Short-Range Ballistic Missile in FY 79 has had an important impact on the ability of the United States to conduct battlefield interdiction with ballistic missiles. The *Lance* missile is capable of both nuclear and nonnuclear fires. As will be discussed subsequently, there is some doubt as to the adequacy of *Lance* due to its short-range to meet the full scope of US theater nuclear requirements.

The ability of the United States to provide a high rate of saturation fire has been inhibited by the complete absence of multiple rocket launcher (MRL) tubes in the US division structure since the latter years of World War II. This conspicuous oversight is being attended to by the planned introduction of the General Support Rocket System (GSRS) in the FY 81 budget. Even after the GSRS is deployed, the United States will continue to have an inferior quantitative capability in multiple rocket launcher tubes compared to their Soviet counterparts who have emphasized saturation fire from MRLs since World War II. The Soviet Union has undergone a

considerable modernization of its MRL capability with the introduction of new 122 mm MRLs, giving it a total MRL capability of more than 700 tubes per division.

The introduction of the *Copperhead* laser guided 155 mm projectile is a major innovation in precision artillery fire. The *Copperhead* can provide a substantial increase in the ability of US artillery to provide high-quality precision targeting for US ground forces if target acquisition problems can be solved in a battlefield environment.[35] In addition, US tube artillery has been substantially improved through the procurement of additional ammunition, heretofore, a major short-fall in US capability. Nevertheless, the United States continues to have a $3.5 billion deficiency in ammunition procurement in the Army and a $9 billion ammunition procurement deficiency for the Air Force, making ammunition a major source of US combat weakness the NATO's Central Front. There are, of course, many problems related to the procurement of additional ammunition, particularly high-density items like 155 mm artillery rounds, because of the extensive real estate required to store large quantities of ammunition. Nevertheless, the shortage of ammunition could create substantial and obvious problems in the event of a conflict because of the requirement for US forces to respond in a timely manner.

The problem is complicated by the fact that US allies are seriously underequipped in ammunition. Most NATO nations lack a 30-day inventory of ammunition, and in many cases the ammunition consumption rates on which the 30-day inventory is calculated is woefully, and perhaps deliberately, underestimated to avoid the necessity of a costly ammunition procurement and storage program. As a consequence, the United States may well have to be the supplier of last resort for substantial ammunition inventories in the course of a conflict. Hence, the US ammunition inventory may be substantially in arrears, even more so than is officially estimated by indigenous US ammunition requirements.

Improving the Rapidity of Response to the Warsaw Pact Threat

The problem of the responsiveness of the US forces to a Warsaw Pact buildup is one of considerable difficulty because of the risks associated with investing substantial forces and equipment in Western Europe. The danger of US forces being overrun in Western Europe cannot be overlooked, because the overrunning of such forces would virtually eliminate the ability of US forces to operate

anywhere outside of the Western Hemisphere if substantial land forces are required. Nevertheless, the US government is proposing to increase the readiness of US forces in Western Europe by increasing the manning level of US Army divisions to 105 percent of their nominal level to assure at least 95 percent manning under contingencies where their immediate deployment is required.

In addition, various POMCUS stocks (Prepositioning of Materiel Configured in Unit Sets) for three additional divisions is scheduled to be completed by the end of 1982. The prepositioning of POMCUS stocks will reduce the dependence on sealift to support the redeployment of US forces from the continental United States to Western Europe in the event of a conflict making it possible to move forces from the continental United States by commercial airlift rather than seaborne transportation that would otherwise be required. To meet the needs of the deployment in Western Europe through the expansion of POMCUS stocks in Europe has made it necessary to deplete substantially US inventories, particularly those destined for Army, Reserve, and National Guard units creating further problems with the reserves.

Given the substantial Soviet force concentrations along the inter-German border, these measures are insufficient, as larger areas of Germany would be lost before a Soviet armored thrust could be slowed or halted. Rather, NATO and US units along the inter-German border need to be configured to preempt a Soviet attack on tactical warning (48 hours). Such a capability would not only provide a more effective defense of Western Europe, but it would also increase deterrence by interposing greater uncertainty in Soviet military planning. To have such a posture would require a greater investment in intelligence and warning sensors, and higher operations and maintenance costs to maintain a higher order of force readiness. As Soviet forces are most vulnerable when forming for an attack, the scale of US/NATO preparations would not have to be large to have the desired military and diplomatic effect.

Improved Air Defense Capabilities

A major weakness exposed by the change in Soviet tactical air power from air defense to ground attack has been the conspicuous weakness of field air defense, particularly along NATO's Central Front. The comforting assumption about the Soviet emphasis on short-range air defense in the FA, valid through most of the 1950s and 1960s, can no longer be sustained with the larger-scale intro-

duction of the *Fencer*, *Fitter*, and *Flogger* aircraft as well as the long-range *Backfire* bomber.[36] Soviet tactical air operations emphasize massive air assaults along narrow fronts, in a manner similar to their ground-based doctrine. This capability will overwhelm existing US and NATO air defenses, which have depended on a linear *Hawk* (surface-to-air missile system) belt along the German border to blunt deep penetration of NATO airspace by Soviet aircraft. As a consequence, four new systems are being developed and scheduled for early deployment and two current systems are being improved. The *Hawk* missile is being improved in a new configuration known as the *Improved Hawk* and missile inventories are being increased. The *Chapparral* low altitude air defense missile is being modernized and procurement is continuing.

The high to medium altitude *Patriot* surface-to-air missile is scheduled for initial procurement in FY 80, with procurement continuing through the 1980s. The initial operational capability of the *Patriot* is scheduled to be April 1982, and the *Patriot* missile may be adopted by other nations in the NATO alliance as well.

A low altitude air defense missile, the *Roland*, a US adoption of a French–German design, is in initial production in FY 80. Unlike the *Bundeswehr*, the *Roland* missile will be used by the United States at the Corps rather than the division level.

A new division air defense gun, a 35 to 40 mm. high rate of fire gun, will be deployed with US divisions, if development is successfully complete, beginning in FY 81. This system will be analogous to the famous Soviet ZSU-23-4 quad 23 mm air defense gun although the US system will be in a twin-barrel configuration. This gun is mounted on a T-54 tank chassis and provides low altitude air defense for the Soviet division on the move.

The low altitude, man-pack portable surface-to-air missile, the *Stinger*, is in procurement and is intended to replace the less capable *Redeye* surface-to-air missile currently deployed with US forces. The increasing use of helicopters by the Soviet Union will make the wide distribution of the *Stinger* surface-to-air missile a particularly important asset. Soviet helicopter operations tend to emphasize swift battalion-sized operations directed against strategic road junctions, transportation networks, command centers, etc. The ability to engage helicopters throughout the depth of the theater is an important capability for which the *Stinger* is well suited.[37] The slow pace of acquisition of air defense equipment compared to the rate at which the Soviet FA is acquiring ground attack air-

craft (due to US budget limitations), however, ensures NATO's vulnerability to air attack for most of the 1980s.

Enhancing the Ability of US Forces for Sustained Combat Operations

The burden of the US effort to increase its capability to sustain military operations is focused on the increase of prepositioned war materiel reserve stocks and the greater interoperability of US forces with their NATO counterparts. The difficulties associated with the prepositioning of war reserve material in Western Europe is already well known and contributes to an important vulnerability by providing the Soviets with a relatively small number of targets that could have the effect, if an attack is successfully executed, of depriving US and NATO forces of most of their war reserve materiel. Previous efforts made by US forces to increase the uploading of ammunition (i.e., the uploading of ammunition on tanks, armored personnel carriers, and self-propelled artillery pieces) has reduced the dependence on central stockpiles for the ability of these forces to respond to a major military contingency, but is only a partial answer to the problem posed by the lack of a dispersed and survivable storage system in Western Europe for war reserve stocks.

The emphasis on interoperability is a difficult one because of the long-standing differences in operational style, and the indigenous development of engines for tactical aircraft and helicopters has led to serious interoperability problems that are not likely to be easily solved. Nevertheless, the efforts, particularly with respect to fuels and some types of artillery and tank ammunition, will have an important impact on the interoperability of NATO forces. An overlooked element in achieving interoperability has, however, been the introduction of the 120 mm gun to the tank forces of the armies of Western Europe. To date, West Germany is likely to be the first to introduce the 120 mm gun, although the United States intends to include it on later versions of the XM-1 tank deployed after 1983. The U.K. is also likely to adopt a 120 mm gun, but it is, at the moment, unclear whether Britain will adopt the 120 mm smoothbore Rheinmetall gun in service with the German Leopard II tank and the US XM-1 or will elect to adopt the rifled British-developed 120 mm gun. The other nations of the NATO alliance have 105 mm guns in their armored vehicles, making the problem of the proliferation of ammunition types a particularly serious one because

of the high consumption rates of tank ammunition expected in any future conflict in Western Europe. Similarly, problems are emerging between both the United States and its Western European allies over the use of propulsion plants in tanks. The United States has adopted a gas turbine engine while the Germans and British have elected to employ diesel engines in their most advanced tanks. It is difficult to measure the extent to which interoperability will materially affect NATO's capabilities, but the overall impact is likely to be small.

Command-Control-Communication and Intelligence (C^3I)

Despite the awesome US lead in communications and computer technology, it is the Soviets that have led the way in the application of electronics to military purposes. In particular, the Soviets have pioneered the notion of electronic warfare as a weapon system in itself justifying a separate doctrine that is integrable into the Soviet pattern of military operations. The United States has tended to look at electronic warfare as a subject apart from conventional military operations and, as a consequence, its application has suffered. The Soviet Union tends to regard electronic warfare as a weapon system that can substantially enhance the performance of their ground forces. The Soviets use electronic warfare as a means of providing signal intelligence for command echelons as well as direction finding for jammers and as a means of target acquisition for Soviet artillery and FA units.[38] The Soviets have developed a comprehensive doctrine associated with electronic warfare under the generic rubric of radio electronic combat.

There is a double irony in this state of affairs in that the United States has not only failed to fully exploit electronics as an instrument of warfare, but has allowed its entire concept of operations to revolve about a highly sophisticated and centralized scheme of command that depends heavily on radio communication (i.e., voice, teleprinter, and data) with deployed forces. The Soviets, apparently recognizing this high degree centralization, have developed a scheme of electronic warfare that threatens the ability of the US commanders to communicate successfully with their forces deployed in the field due to Soviet electronic warfare tactics. Perhaps the most direct US response to the use of Soviet jammers in its electronic warfare doctrine is the development program for expendable countercommand-control-communication jammers. These jammers are artillery-launched and are intended to disrupt

Soviet jammers and Soviet direction-finding units, thwarting the ability of the Soviets to exploit its electronic warfare capability for target acquisition purposes. Nevertheless, this program is on a modest scale by any standards, with only $8.8 million proposed for R&D in the FY 80 budget. The United States continues to lack a doctrine adequate to the magnitude of the problem it faces in electronic warfare and, until an adequate doctrine is developed, it is unlikely that properly organized and directed programs will emerge that can address the threat posed. Until such improvements are made, the United States will remain conspicuously vulnerable to Soviet electronic warfare tactics and may find its forces subject to catastrophic failure because of the inability to communicate successfully during combat operations. It should be noted that the Soviets have made the destruction or paralysis of the command apparatus the central objective of their military operations. The United States, with its doctrine favoring the attrition of Soviet forces, has tended to give little attention to assuring the survivability of own its C^3I facilities.

Chemical Warfare

Perhaps the most long-standing and obvious vulnerability of US forces to Soviet forces in Europe is the unchallenged capability of the Soviets to operate in a chemical environment. Soviet military doctrine involves the notion of preparation for "all" means of attack including nuclear, chemical, conventional, and paramilitary warfare. As a consequence, Soviet vehicles have long been equipped with collective protection systems of pressurized crew compartments to prevent the intake of chemical aerosols, as well as equipping all armored vehicle crew members with individual chemical warfare protective clothing. In addition, each Soviet division has a full complement of decontamination equipment (assigned to the division's chemical battalion) to decontaminate vehicles and other facilities. The equipment is from some perspectives relatively primitive, but few analysts would doubt its operational effectiveness. On the other hand, US and NATO forces as well are woefully ill-equipped to operate in the chemical environment. With but a few exceptions, few vehicles in the entire NATO inventory are capable of operating in a chemical environment. A conspicuous exception is the equipment currently being deployed with the Bundeswehr, particularly the *Marder* armored personnel carrier and the *Leopard II* tank. The United States continues to

foresake the notion of equipping its vehicles with collective protective systems that could enable the vehicles to operate in a contaminated (e.g., by lethal chemical aerosols) environment. The XM-2 and XM-3 Infantry/Cavalry-fighting vehicles as well as the XM-1 tank will not be equipped with collective protection systems. This makes them vulnerable to the intake of nuclear contaminants carried on dust particles as well.

The ability of the United States to retaliate with chemical weapons is likewise very limited because of the failure to introduce modern lethal chemical agents to the US inventory. The most promising advance is in binary chemical weapons where inert components are contained within an artillery projectile or bomb, but are not mixed in a manner that would provide them with their desired lethal properties until they are fired or dropped. The mixing is carried out by the rotation of the artillery shell after sustaining the set-back force from being fired from an artillery tube. A similar technique would be employed in the use of air-delivered lethal chemical munitions as well. The existing US inventory consists of a small number of artillery shells and bombs that are difficult to handle, with few forces capable of employing them, and the utter lack of a practical doctrine for their employment that would render it militarily effective in a two-sided exchange of chemical munitions. The problem of chemical warfare has many of the properties of a debate few of the appropriate participants are willing to discuss. The apparent reluctance to discuss it stems from the widespread abhorrence of chemical weapons, and the recognition that to acknowledge the existence of the problem would require a rather massive change in R&D, procurement, training, and doctrine in most of the armies of the West—a clearly unattractive course of action for any Western defense planner. As a consequence, US activities in the chemical warfare field are primarily focused on the development of warning systems, the procurement of decontamination equipment, and the better understanding of the means of protection and defense against a chemical attack.

Tactical Air Power

The proposals advanced by the Carter Administration to address the shortcomings in US GPF for land warfare is paralleled by many of the improvements proposed for the US tactical air power component. Like their counterparts for US ground forces, the proposals will enhance the performance of deployed tactical air units

but, due to budget limits, remain inadequate to meet the threat they are intended to address.

Fully Equipped 26 Wings of US Air Force Tactical Aircraft

The FY 80 budget proposed the procurement of 175 F-16, 60 F-15, 144 A-10, and the procurement of advanced air-to-air missiles—the AIM 7-F/M and the AIM-9L. Although the United States possesses a tactical air order of battle of 26 aircraft wings, these wings are not fully equipped with their complement of tactical aircraft. The current US tactical airpower Order of Battle is shown in Figure 4.5. Under present budgetary constraints, they will not be so equipped until FY 81 and will still have inadequate numbers of aircraft to meet the inevitably high initial rate of attrition in a general conflict in Europe. Moreover, a chronic failure to procure adequate inventories of spare parts (e.g., F-100 engine cores for the F-15) threatens the combat readiness of aircraft already procured. The spare parts deficiency may exceed $3 billion.

Modernized Air Reserve and National Guard Units

During the 1960s, the US Air Force Reserve and National Guard units were modernized with the introduction of the A-7, F-4, and F-105 tactical aircraft. These aircraft are now approaching military obsolescence and, as a consequence, the Reserve and National Guard units must be modernized. The Administration proposes to introduce the F-16 and A-10 to replace these obsolescent aircraft. Unlike the US Army, the Air Force Reserve and National Guard units have played a major role in the operations of the active Air Force in most recent US conflicts. The mobilization of the Air Reserve and Air Guard is not fraught with the political difficulties associated with the mobilization of the Army Reserve or National Guard and, hence, the Reserve and Air National Guard in the Air Force has received more operational attention than have the shortcomings that have afflicted the US Army Reserve and National Guard units for more than a decade.

Electronic Warfare and Counter Command-Control-Communication

The employment of the US Air Force in an environment with an electronic capability has been a major staple of US Air Force doctrine for decades. This requirement has arisen primarily because of the need to penetrate enemy air defenses that frequently include sophisticated radars. The US response to problems of penetrating

FIGURE 4.5
Tactical Air Power: US Order of Battle (FY 80)
(US Air Force Only—Airlift Excluded)

Active Air Force	Number
Fighter/Attack Wings	
A-7	1
A-10	3
F-4	13
F-15	5
F-16	1
F-111	3
Other Units	
Airborne Early Warning (E-3A) Squadrons	3
RF-4 Reconnaissance Squadrons	6
Tactical Air Control Squadrons	11
Special Operations Force Squadron	5
Air Force Reserve and National Guard	
Fighter/Attack Wings	
A-7	4
A-10	1
A-37	1
F-4	3
F-105	2
Other Units	
Electronic Countermeasures Squadron (EC-130)	1
Reconnaissance Squadrons (RF-4)	8
Tactical Air Control Squadrons	6
Special Operations Force Squadrons	2

Non-U.S. Deployments			
Europe			
4	A-10 Squadrons	2	RF-4 Squadrons
11	F-4 Squadrons	2	Tactical Air Support Squadrons (OV-10)
4	F-15 Squadrons	1	Special Operations Force Squadron
7	F-111 Squadrons		
Pacific			
9	RF-4 Squadrons	1	RF-4 Squadron
1	F-15 Squadron	1	Special Operations Force Squadron
Dual Based (U.S. Based for Rapid Redeployment)			
3	RF-4 Squadrons (For deployment to Europe)		
2	F-4E Squadrons (For deployment to Europe)		
3	F-4 Squadrons (For deployment to Alaska)		

hostile radar guided air defenses is perhaps best exemplified by the production of the EF-111A aircraft. The EF-111A is a dedicated electronic warfare aircraft produced from a modified F-111A. In operation, the EF-111A would escort attack aircraft to their target and assist their penetration by jamming enemy radars that would otherwise permit the attacking aircraft to be intercepted by

ground- or air-based interceptors. The employment of the EF-111A exemplifies the differing tactical styles of the United States and its NATO allies.[39] Its NATO allies, in particular the German Luftwaffe and the British Royal Air Force, have elected to employ other tactics that reduce the requirement for dedicated jammer aircraft such as the EF-111A, focusing instead on low-level penetration of enemy air defenses. The RAF/Luftwaffe approach is one that relies for its success on the ability of high-performance aircraft to penetrate hostile air space at extremely low altitudes, employing only simple jammers to prevent lock-on by local radars. Such an approach puts a greater strain on target acquisition, shifting the burden from Air Force-oriented target acquisition systems (e.g., AWACS or Precision-Location Strike System) to ground-based target-acquisition systems. Hence the US approach is one that reflects the doctrinal preferences of the US Air Force for the centralized management of the air/ground battle. An important function of the future NATO commanders will be to find a means of harmonizing the differing approaches to tactical air operations so that NATO forces will operate effectively in all sectors of the NATO region.

Similar efforts to increase the effectiveness of US electronic warfare capabilities are included in such programs as the *Compass Call* Program. It is an airborne communications jamming system whose function it is to reduce the effectiveness of the Soviet counter-air warfare forces, and the Advanced Self-Protective Jammer (ASPJ) Program that, if successfully developed, will enhance the ability of the US Air Force and Navy tactical aircraft to penetrate hostile air defenses with less reliance on dedicated jammer aircraft of the EF-111A and EA-6 type currently in vogue.

Target Acquisition and Reconnaissance

Consistent with the Air Force doctrinal preference for the centralized management of the air battle is the requirement for the generation of target information for the application of US weapon systems, especially air-to-ground weapon systems. The most important programs in this regard are the Precision Location Strike System (PLSS). This system will be tied to a standoff weapon system, probably the GBU-15, that will enable tactical aircraft to attack targets at up to 60 miles standoff range to avoid encountering the high density of air defenses expected to exist in the modern battlefield, especially those organic to the Soviet Tank and Motorized Rifle Division.[40] This system will be particularly important for attacking targets that emit electromagnetic radiation such as

command centers, air defense sites, and communication facilities—targets essential to the disruption of a Warsaw Pact attack.

Consistent with the requirement to generate targets for attack by US/NATO systems is the TR-1 program, a modified U-2 aircraft that will provide continuous all-weather standoff reconnaissance of the battlefield to several hundred kilometers behind the forward edge of the battle area. As sensors become more sophisticated providing higher quality information on the location of not only emitting targets, such as radars and command centers, but also such lucrative targets as mechanized formations, either on the move or at rest, concealed artillery and surface-to-surface missile batteries, etc., the better the picture of the situation facing a combat commander will be understood. Understanding the current status of the conflict will permit the commander to optimize his response to meet the most serious threat first and progressively attacking lesser threats as they emerge. The risks associated with such a posture are that current technology requires great centralization of such information to relatively few command centers that are vulnerable, and the disruption of this command chain could have the effect of inducing a catastrophic failure of US/NATO forces to meet the threat posed. The eventual development of distributed information technology that could permit the direct dissemination of material from collection systems like the TR-1 to the battlefield commander without the need of a complete set of centralized processing facilities to route the material to the appropriate military organization will substantially change the character of modern warfare. However, although the technology of distributed information systems is gradually beginning to be understood, considerable advances are required before its widespread application to modern military forces. This makes it unlikely that the US/NATO Armies will be able to take advantage of it within the next decade in any substantial measure at current funding levels.

The proposed modernization for US ground and tactical air forces reflects the environment in which the modernization decisions were made, namely an environment of a severe budget constraint. As a consequence, the forces procured reflect the measure of what could be procured within the confines of a three percent (actually less due to unanticipated inflation) increase in real defense expenditures rather than a measured consideration of what is required to address the changes in the Soviet threat that have taken place over the past decade or more. Had the FY 80 defense budget been transported in time back a decade earlier, when the

initial fruits of the Soviet modernization program were emerging, the cumulative effect of such US investment would have had a substantial impact on US and NATO capabilities in the ensuing decade. However, owing to the weight of prior Soviet investment, the US program is likely to have little effect on the military balance in Europe, even if extended over the period envisioned in the FYDP. The basic sources of US and NATO weakness are, in part, resolvable by the investment of greater resources into the defense establishment, but also required is a change in the "style" in which US forces are operated. The major shortcomings of US (and NATO) forces is the lack of adequate combat power in its existing forces and the lack of adequately ready reserves. While the proposed US modernization program is likely to make small changes in the combat power of deployed US forces, it is unlikely to have a major effect on the relative combat strength of US forces.

On the other hand, with the exception of somewhat greater investment in the Air Reserve and National Guard modernization, little is being done in the way of improving the capability of US Reserve Forces to respond to a major military contingency.

US Theater Nuclear Forces

Theater nuclear forces have been an essential component of US defense policy since they were introduced in the mid-1950s. In the lexicon of the Secretary of Defense in the mid-1950s, Charles Wilson, theater nuclear forces were perceived of as a means of acquiring more "bang for the buck"; a means of substituting the vast firepower of nuclear weapons for costly deployment of troops to Europe. Over time, the Soviet Union acquired sophisticated and extensive theater nuclear forces as well and the concepts that dominated the initial deployment of theater nuclear forces no longer remained persuasive to policymakers. For more than two decades, US theater nuclear posture in Western Europe suffered from a substantial lack of attention. This was reflected in the fact that little was done in the way of modernizing the US theater nuclear posture beyond the plans that were originally conceived in the late 1950s and early 1960s and executed throughout the ensuing years. These choices reflected the impact of incremental technological change far more than it did any evolution of policy with respect to theater nuclear forces. Following the years of Soviet buildup in Eastern Europe, US policymakers began to examine the US theater nuclear force posture more carefully in light of the central role theater nuclear forces played in the strategy of the

defense of Western Europe embodied in NATO document MC 14/3. A report to the Congress, prepared by the DOD under Secretary of Defense James R. Schlesinger in 1973, began a still-continuing process of reshaping of the NATO theater nuclear force posture that has important consequences for the military capability of the United States and Europe.[41] As a result of Soviet defense investment in theater nuclear forces, a number of major deficiencies have been exposed in the US and NATO theater nuclear force posture that warrant early attention.

1. US and NATO forces are at risk to Soviet long-range theater nuclear force deployments. The NATO nations lack an equivalent capability to threaten Soviet systems.
2. The NATO theater nuclear posture is heavily concentrated in extremely short-range systems, most ($\cong$ 60 percent) with a range of 15 kilometers or less.
3. Most NATO and US theater nuclear forces lack survivability for a host of technical and operational reasons. Moreover, the relatively confined "battle space" of Western Europe provides few opportunities for substantial dispersion of theater nuclear forces.
4. US and NATO theater nuclear forces cannot survive a major chemical, conventional, or paramilitary attack. This problem relates to the want of dispersion, the central location of many of NATO's nuclear weapon storage depots, and other technical and operational characteristics that contribute to vulnerability.
5. US and NATO nuclear armed forces cannot operate in a nuclear environment. Most Soviet theater nuclear forces have their armored vehicles equipped with collective protection systems that enable them to operate in both a nuclear and chemical environment, a property that is virtually absent from US forces as a whole, including theater nuclear forces.
6. Maldeployment of US theater nuclear forces has tended to concentrate most nuclear delivery systems in southern Germany, leaving most of the North German Plain without a substantial deployment of theater nuclear forces, a conspicuous weakness when most means of theater nuclear delivery are concentrated in systems with a range of less than 15 kilometers.
7. The characteristics of theater nuclear forces including the numbers of these forces, their range, and the attributes of the nuclear weapons themselves (i.e., yield and output spectra), have been outmoded by the evolution of the Soviet theater nuclear

force posture in Europe. The most threatening parts of the Soviet deployment in Eastern Europe are the second echelon units of the Soviet armed forces that will be available to reinforce and exploit breakthroughs made by Soviet forces currently deployed in Eastern Europe capable of launching an unreinforced offensive. The lack of suitable theater nuclear forces prevents the United States from having a capability to hold at risk, if not attack, second echelon forces. The nuclear yields of US theater systems, particularly those of medium- and long-range, are far higher than is either necessary or desirable. The relatively high yields were a product of an era when delivery accuracies were far inferior to those available to modern delivery systems. Hence, a vast amount of explosive energy was required to fill an area with destruction to assure complete destruction of the target. Such is no longer necessary, and a modernization of US theater nuclear programs must include a reduction in the yield of most theater nuclear systems.

Requirements for US Theater Nuclear Forces

The evolution of a modern system of theater nuclear forces would require that theater forces have a number of properties not currently included in deployed forces. US theater nuclear forces must be able to survive a conflict in a nonnuclear phase; that is, they should have a low order of vulnerability to nonnuclear attack, including chemical, conventional, and paramilitary assault. To do so, theater forces must be dispersed, their numbers increased, and they must be able to take advantage of positional uncertainty to assure lack of an ability on the part of an adversary to pretarget these weapons.[42]

Modern theater nuclear delivery systems must also be tied into a command-control-communication-intelligence system that allows them to acquire, track, target, and attack both fixed and transitory targets. Transitory targets include both mobile installations such as an armored detachment on the move, and transportable installations such as surface-to-air missile battery deployed in an area for a brief period of time, or an armored column at rest in a second echelon holding area.[43]

Theater nuclear forces also require an ability to operate, at least in a limited way, in a nuclear weapons environment. This includes survivable C^3I forces as well as theater nuclear forces that have a lower order of vulnerability than those currently deployed.

Moreover, theater nuclear forces deployed by the United States,

particularly in Western Europe, need to have the property that they can shift from a nonnuclear to nuclear mode without giving advance warning to their Soviet counterparts. There are a number of important reasons for doing so. Perhaps the most compelling is that the mere existence of theater nuclear forces imposes difficult choices on an attacking force. For the greatest effectiveness, conventional forces require high orders of concentration to effect the ability to breach prepared defenses with massive firepower sustained at a narrow front. Such a posture, however, makes these forces highly lucrative targets to nuclear attack because nuclear weapons are most effective at destroying such concentrated targets. For the most effective posture in executing a nuclear attack, forces must be dispersed in the event that a retaliatory strike is directed against these forces. Dispersed forces are far less vulnerable than concentrated forces. If US theater nuclear forces are able to switch from a nonnuclear to nuclear mode without giving advanced warning, a Soviet combat commander faces a difficult choice—a choice that will almost certainly require that he "hedge" his deployment to reduce its vulnerability to nuclear attack. Such a prospect will cause his nonnuclear attack to lose an important fraction of its military potential owing to the lack of concentration.[44]

Improvements to US Theater Nuclear Forces

Short-Range Delivery Systems (<50 km). One can classify US theater nuclear systems in four essentially arbitrary categories relating to the range of the systems deployed. The predominant short-range theater nuclear force is, of course (excluding mines, naval and air defense weapons), tube artillery. In the nuclear-capable inventory currently are 203 mm (eight inch) and 155 mm howitzers. These howitzers are self-propelled and are deployed in substantial numbers in Western Europe. Because these artillery tubes are "dual capable" (i.e., are capable of firing conventional as well as nuclear rounds), they have the important attribute of survivability because the adversary cannot know which artillery tubes are actually capable of launching a nuclear round and thus must consider every artillery tube as a potential nuclear delivery system. This makes it essential that the United States retain in its inventory a modernized nuclear round for both the eight inch and the 155 mm howitzer to assure the maximum survivability of artillery. The artillery as currently deployed, however, has inadequate range. Most of the tube artillery tubes have a range of 15 kilometers, which may be increased to as much as 30 kilometers with the

addition of a small rocket motor to each projectile (known as a rocket-assisted projectile), but increasing the range by a factor of two beyond this would be most desirable. This requirement is necessary because of the fact that a substantial fraction of Soviet artillery has a range capability of 20 to 30 kilometers, thus making such artillery vulnerable to counterbattery fire from Soviet artillery units. Moreover, the battlefield targets within 50 kilometers of the forward edge of the battle area are numerous, and the ability to direct artillery fires on these targets (assuming the target acquisition assets exist) could have an important effect on the battle as well as the cost of procured forces that could reduce the requirement for both close air support aircraft and more expensive short-range cruise and ballistic missiles.[45]

The smaller number of US artillery pieces deployed in Europe (compared to the Soviets) places a premium on the rate of fire.[46] Regrettably, US artillery pieces generally have a slower rate of fire than their Soviet counterparts even though the individual nonnuclear rounds are substantially more lethal. An important advance could be made to the employment of artillery in the theater if a higher rate of fire could be achieved. Further, it would be highly desirable if enhanced radiation/reduced blast (often, but inaccurately known as the neutron bomb) could be developed for both the 203 mm and 155 mm rounds to assure that appropriate targets could be subject to attack in areas that are subject to high concentrations of population and structures so that collateral damage could be substantially avoided.

Medium-Range Nuclear Delivery Systems (<400 km). Medium-range systems have had a low order of priority in the US theater nuclear posture, as has been suggested earlier. The primary contributor to these medium-range systems, the *Lance* ballistic missile, is in common parlance a short-range ballistic missile with a range of less than 200 kilometers. This system is deployed in relatively small numbers and lacks sufficient range to attack most second echelon targets. Rather, a ballistic missile of a range of 200 to 400 km would be more desirable, even though it retained the other properties that the *Lance* missile currently has, including an ER/RB option as well as a nonnuclear warhead. The nonnuclear munition could be useful in a number of scenarios, particularly if sufficient delivery vehicles were available to provide a nonnuclear deep-strike option, particularly against such targets as forward air bases where the use of specially designed conventional munitions could provide a capability for runway heaving as well as the more

traditional roles of delivering cluster munitions against concentrations of personnel and thin-skinned armored vehicles and trucks. A longer-range system could be inexpensively developed through a modification of the *Patriot*'s surface-to-air missile to the surface-to-surface role.

Long-Range Nuclear Delivery Systems (>2000 km). From a theater perspective, the most conspicuous long-range system has been the *Pershing I* missile with a range that has been constrained to approximately 450 miles. This range constraint, an outgrowth of a bureaucratic division of labor between the Army and the Air Force to restrict the role of the US Army ballistic missiles to approximately 450 miles range (the 1947 Key West agreement), is no longer realistic or adequate from the perspective of a future conflict in Europe. A longer-range version, currently under development in the *Pershing II* program, is required. This is necessary because many Soviet second echelon divisons are deployed in the three major Western military districts of the USSR, the Carpathian, Byelorussian, and Baltic military districts beyond the range of *Pershing I*. A longer-range *Pershing* with a range of up to 2,000 km could have a useful effect on the ability of US forces to operate against Soviet forces if the Pershing II or similar long-range or cruise missiles had the properties of substantial delivery accuracy (less than 30 meters), a choice of nuclear and nonnuclear munitions as well as a variety of types of nuclear munitions, including multiple warheads, earth-penetrating warheads, traditional thermonuclear warheads, and ER/RB options.

Very Long-Range Nuclear Delivery Systems (>2000 km). Very long-range theater nuclear systems, those with the range in excess of 2,000 km have been limited to the use of tactical aircraft, particularly the F-111, and the *Polaris/Poseidon* submarines (SSBNs) assigned to the Supreme Allied Commander, Europe (SACEUR). These systems have always been few in number and lack some of the most desirable properties for use in the theater including a high-order of delivery accuracy. Attacks at such ranges could be carried out by the *Trident* submarine/missile system, particularly the *Trident II* with an upgraded guidance system. This mission could also be augmented by the introduction of ground- and sea-launched cruise missiles. If SALT rules were relaxed to permit the deployment of cruise missiles aboard surface ships, another option would be provided.

A more recently available alternative for theater nuclear force modernization has been made available by the deployment of the

"core" aircraft concept. A single air frame, derived from the R&D program on the B-1 bomber is modified to exploit "add-on" components that could give it an air-launched cruise missile or penetrating bomber role. This would make it adaptable to both the strategic and theater roles. An analogy to the assignment of "strategic" SSBNs to SACEUR could be achieved by the assignment of a number of long-range aircraft of this type that could be used to perform the very long-range theater strike mission. The development of such systems could have a useful diplomatic effect as well by providing a genuine element of symmetry to eliminate the current anomaly that allows Soviet forces to threaten Europe, but European-based forces cannot threaten the Soviet Union. The deployment of very long-range theater nuclear forces in substantial numbers could offset this debilitating asymmetry that has done considerable damage in the form of the erosion of European morale about the ability to deter the Soviets from seeking to employ nuclear weapons against Western Europe.

The modernization of US theater nuclear forces is a comprehensive subject because theater nuclear forces are integrated into existing GPF and do not constitute a separate force of their own. The incremental cost of theater nuclear force modernization would range from $3 to $10 billion depending on the extent to which long-range and very long-range theater systems were extensively modernized. For ranges up to 2,000 kilometers, the cost would be relatively modest—in the $3- to $5-billion range because of the ability to exploit a substantial amount of technological work that has already been carried out, namely, on the *Pershing II* and the ground-launched/sea-launched cruise missiles. As these forces can exploit the same C^3I capability that is being developed for the nonnuclear forces, the incremental burden of modernized thermonuclear forces on C^3I is relatively small. Nevertheless, a modernized theater nuclear posture could have a virtually revolutionary effect on the ability of the United States to maintain deterrence in Western Europe. The modernization by the Soviet Union of its long-range theater nuclear forces has had an adverse effect on the ability of the United States to defend Western Europe. Such systems as the SS-20, a MIRVed 4,000 kilometer intermediate range ballistic missile, the TU-22 *Backfire B* strategic bomber, and the deployment of the *Fencer* and *Flogger* aircraft have greatly increased the ability of the Soviet Union to attack forces with nuclear weapons throughout the depth of Western Europe (e.g., the typical Soviet ground attack aircraft in East Germany can deliver

four times the bomb load on London today as it could deliver against Frankfurt a decade ago). The ability of the United States to maintain a genuine symmetry of capability from short- to very long-ranges in the theater could substantially undermine the diplomatic as well as military utility of the Soviet theater nuclear force investment program.

An alternative to consider, in addition to or in some cases *in lieu* of modernization of long-range theater nuclear systems, is the potential deployment of an anti-tactical ballistic missile system (ATBM). Technically, the problem of defeating tactical ballistic missiles is far less difficult than defeating strategic missiles because of the slower speed of penetration and the larger radar cross section (i.e., visibility to radar) of tactical warheads. Incremental advances made in R&D on strategic ballistic missiles defense has greatly improved the prospects for tactical ballistic missile defense. The *Patriot* surface-to-air missile system could be restored (it formerly was capable of performing the TABM mission) by increasing the power of the radar, increasing the acceleration of the interceptor, and data processing modifications. The exploitation of anti-tactical ballistic missile technology is a complex matter but one cannot exclude the potential utility of an ABM in many circumstances in Europe as a means of mitigating the threat posed by the high density of Soviet ballistic missiles. If, from a diplomatic perspective, it were not feasible by negotiation to induce the Soviets to reduce their deployment of long-range theater ballistic missiles, the introduction of tactical ballistic missile defense might be a useful subject to raise at the 1982 ABM Treaty Review Conference. A summary of the current US theater nuclear force posture, required capability, and potential improvement is shown in Figure 4.6.

Military Personnel

Perhaps the central issue to be resolved that bears in important ways on the effective performance of US GPF is the issue of military personnel. The central problems affecting the performance of US GPF are the organization of the active forces and the structure of the reserves. US armed forces, in particular its ground forces, lack adequate combat power in active deployed formations and suffer from the lack of adequate reserve forces. The lack of combat power in US divisions tends to reflect the force structure selected for the US Army.

The US Army force structure is composed of 16 divisions. These divisions are so organized to enable them to remain in combat

FIGURE 4.6
U.S. Theater Nuclear Force Posture:
Current Capability and Potential Improvements

	Currently Deployed Systems	Required System Capability	Potential Improvements
Short Range (<30 km.)	Artillery (155mm./203mm.)	30-60 km.	Long range artillery High rate of fire Enhanced radiation/ reduced blast
Medium range (<200 km.)	Lance	200-400 km.	Upgraded air defense missile in surface-to-surface role (e.g., Patriot) Assault Breaker
Long range (<2000 km.)	Tactical air Pershing I	600-2,000 km.	G/SLCM, Pershing II
Very long range (>2000 km.)	Polaris/Poseidon SLBM	>2,000 km.	G/SLBM, Trident Core Aircraft Concept

continuously for years on end (*a la* World War II) should circumstances so require. As a consequence, the United States has developed a system of individual rather than unit replacement, the latter being the preferred mode of mobilizing the reserves in the Soviet Union and in several European armies. Thus, although the Soviet Union has only three times as many men under arms in its ground forces as does the United States, it is able to extract more than ten times the number of divisions. This reflects the doctrinal and organizational choices the Soviets have made enabling them to deploy substantial combat power in each division. Soviet divisions, as a consequence, are highly capable, particularly under circumstances where they have the opportunity to elect the circumstances under which a war will begin. See Figure 4.7 for a description of the distribution of equipment in US and Soviet divisions. Note that the current Soviet force structure contains 170 divisions (including 8 airborne divisions).

The Soviet division contains more maneuver battalions than does its larger US counterpart. The Soviets necessarily lose "staying power" as a consequence of such a choice because the increase in the number of combat spaces within the Soviet division necessarily reduces the number of support spaces that would otherwise be available to ensure the continuous operation of its forces.[47] The behavior of the Soviet forces is probably replicated by that of its

FIGURE 4.7
Comparative Division Equipment Sets: US and Soviet Armored and Mechanized Divisions

	UNITED STATES[a]			SOVIET UNION	
	Armored Division	Mechanized Infantry Division		Tank Division	Motorized Rifle Division
Personnel	16,850	17,800	Personnel	11,000[b]	13,000
Medium tanks	324	216	Medium Tanks (T-62/72)	325[b]	266
M60 dozers	18	12	Light Tanks (PT-76)	22	22
M551 light tanks	27	27	Armored Personnel Carrier (BMP)	132	112
M114A1 reconnaissance vehicles	179	176	Wheeled APC (BTR-50/60P)	24	210
M557 Command vehicles	132	127	BRDM Reconnaissance Veh.	124	153
M113A1 armored personnel carrier	376	406	152 mm. SP gun	18	18
155 mm. self propelled howitzer (m109A1)	54	54	122 mm. SP gun	6	6
203 mm. (8 inch) self propelled howitzer (M110A1)	12	12	122 mm. towed gun (D-30)	36	72
107 mm. mortar (M106A1)	53	49	120 mm. mortar	18	54
81 mm. mortar (M125A1)	45	54	122 mm. Multiple Rocket Launcher (BM-21)	18	18
20 mm. self propelled anti-aircraft gun (M163)	24	24	FROG surface-to-surface missile	4	4
Chapparral surface-to-air missile carrier (M730)	24	24	57 mm. anti-aircraft gun self propelled (ZSU-57-2)	18	6
TOW anti-tank missile carriers	90	108	23 mm. anti-aircraft gun self propelled (ZSU-23-4)	16	16
Dragon anti-tank launchers	254	294	57 mm. anti-aircraft gun towed (S-60)	30	30
Armored recovery vehicles (M578 and M88)	99	91	23 mm. anti-aircraft gun		
Combat Engineer-vehicle (M728)	8	8			
Armored vehicle launched bridge	18	14			

FIGURE 4.7 (continued)

Observation helicopter (OH-58)	66	66	towed (ZU-23-2)	6	18
Utility helicopter (UH-1H)	54	54	SA-9 surface-to-air missile carrier	16	16
Attack helicopter (AH-1G)	9	9	SA-7 surface-to-air missile	86	128
Attack helicopter/anti-tank (AH-1S)	42	42	100 mm. anti-tank gun	--	18
			Sagger/Swatter anti-tank guided missile carriers	9	27
			Man-pack Sagger anti-tank guided missile	12	36
			76 mm. recoiless rifle (SPG-9)	9	12
			RPG-7 Rocket launcher	400	660

[a]This table reflects the current U.S. Army Table of Organization and Equipment (TO&E) of 6 armored and 5 mechanized infantry battalions per armored division and 4 armored and 6 mechanized infantry battalions per Mechanized Infantry Division. The proposed reorganization of the U.S. division structure will increase the troop strength of an armored division to 17,800 in 9 armored and 6 mechanized infantry battalions. A Mechanized Infantry Division will be increased in strength to 18,000 troops in 7 armored and 8 mechanized infantry battalions. Equipment compliments will also increase: to 360 medium tanks, 16 203 mm. howitzers, 96 155 mm. howitzers and additional anti-tank weapons in an armored division, and an additional 22 tanks as well as artiliery and anti-tank guided missiles will be added to mechanized infantry divisions.

[b]One additional tank company per tank regiment has been assigned to each of the 10 Soviet tank divisions in the Group of Soviet Forces in Germany (GSFG) for a total of 415 per division.

SOURCE: International Institute for Strategic Studies, The Military Balance, 1978-79 (London: IISS, 1978), pp. 101-2.

allies in that, as we have seen in the 1973 Arab-Israeli war, the Arab armies tended not to seek to repair slightly damaged armored vehicles on the battlefield, instead replacing damaged armor vehicles with new equipment. The Soviet proclivity for the procurement of vast inventories of combat consumables reflects this doctrinal difference. The lack of combat power in US divisions has been a property recognized in recent years and has been met by the conversion of several thousand support spaces in US divisions to combat spaces. In addition, the division restructuring in the US Army will increase the size of the division as well as the number of maneuver battalions in each division.

A matter related to the subject of organization, but too lengthy to discuss here, is the issue of the tactical doctrine of the US Army. The current tactical doctrine, embodied in the US Army Field Manual, FM-100-5, reflects the current preference for firepower and attrition in the doctrinal emphasis of the US forces rather than speed and maneuver. These choices are fundamental because they have implications for the manner in which the Army conducts engagements, the equipment it procures, and its command and control structure. The emphasis on a doctrine of attrition tends to place a lesser emphasis on maneuver units and a greater emphasis on unit firepower. By way of contrast, the Soviet doctrine of maneuver and the rapid exploitation of penetration made by its armored and mechanized forces tends to require the kind of organization that is currently embodied in its armed forces. This includes large numbers of mechanized units with a doctrinal focus of disrupting the command apparatus of an adversary rather than solely destroying his forces. The US approach to be successful requires a lavish amount of equipment (e.g., the US experience in World War II where the United States generally employed attrition against the German's maneuver doctrine) relative to the adversary. Resolution of this crucial controversy is not primarily a question of resources—it is a policy question of the most fundamental and decisive kind.

Reserve Forces

Closely related to the doctrinal organizational preferences that are imbedded in the structure of the US Army are the issues of the relationship between the active forces and the reserves. With the exception of the major wars, World War I and World War II, the United States has normally relied most heavily on its active forces with little attention paid to the exploitation of its reserves, par-

ticularly the Army Reserves except for selected units. The size of the Army Reserves and National Guard units that have existed since World War II have been a result of the operation of the conscription system (i.e., Selective Service), whereby those not conscripted into the regular forces often have the opportunity of joining the Army Reserve or National Guard. In addition, those who completed their active service as conscripts were obliged to complete their military service in the Army Reserve. This arrangement, which assisted the Reserve and Guard units in maintaining their authorized strength, ceased to be available after the demise of conscription in 1973. As a result, there has been a substantial and continuous fall-off in the strength of the Army Reserve and National Guard. Indeed, the Individual Ready Reserve (IRR) has fallen from a strength of nearly 1,000,000 to approximately 200,000 in the period of a few years.

The state of the Army Reserve and National Guard units, particularly with respect to their inability to retain their authorized strength, combined with the perceived shortcomings of the all-volunteer force, have led many critics of the US armed forces to focus on the issue of the restoration of conscription as a means of improving the quality of the active forces and increasing the strength of the Reserve Forces. The extensive debate carried out in the Congress on the FY 80 defense authorization is likely to be repeated in subsequent years as the difficulties associated with the all-volunteer force and the Reserves continue to mount.

The difficulties associated with the all-volunteer force are a separable one from the problems of the Reserve, although it is possible to imagine a solution that could involve improving the capability and readiness of both forces. The all-volunteer forces were designed to replace the high turnover conscription system with a low turnover regular force that would be, in every respect, highly professional. In brief, those expectations have not borne fruit. The all-volunteer force has become a high turnover force, albeit at high budgetary cost. The level of professionalism is not as high as expectations would have it because of the high turnover and the resulting low productivity associated with relatively brief tours of duty. The high budgetary cost associated with paying "market" wages to enlistees has been exacerbated by the continuing high budgetary costs imposed by a high turnover force. A high turnover means the requirement for the maintenance of a large training base where 15 to 20 percent of all active duty army personnel are currently engaged—as instructors, support staff, or train-

ees. Operational equipment required to be used during the training cycle is heavily exploited because of the high turnover. Because the annual accessions are required to be approximately 40 percent of authorized strength, the drain on operation and maintenance funds is considerable. Reenlistment bonuses required to retain trained personnel increases cost as does the obligatory promotions asociated with reenlistment.

The details of a reform of the all-volunteer force are too lengthy to go into here as they have been discussed elsewhere, but the outlines of a reform proposal can be discussed.[48] The objective of the all-volunteer force should be to increase the average initial enlistment to approximately five years. This is not an uncommon practice in some European armies and has considerable benefit if it can be carried out. In addition to soliciting longer initial enlistments, greater effort should be made to reduce the incentives for reenlistment; a 15 to 20 percent retention rate would be adequate. If reenlistment is discouraged, the costly burden of retirement benefits can be checked. Retirement benefits now constitute an $11 billion annual charge to the DOD. Longer initial enlistments will also help reduce the high cost of operation and maintenance by reducing the size of the training base as well as the wear and tear on operational equipment. In addition, troops engaged in military service for a longer period of time will, because of their knowledge of their job, be more productive and thus capable of making a greater contribution. Nevertheless, without the pressures of reenlistment and promotion usually attendant, this greater productivity and professionalism can be obtained at a more modest budgetary cost than is currently feasible with a system of short initial tours of duty followed by costly reenlistments. Focusing on longer initial first-term enlistments would also have the property of reducing the number of accessions required annually, thereby enabling recruiters to focus on a smaller number of prospects for recruitment rather than to extend their reach to much larger numbers of marginal participants who frequently become disciplinary problems when brought into the military services. The statistic of 40 percent of initial enlistees not completing their first term of enlistment reflects the difficulties the current approach has for the armed forces and, in particular, the Army.

Other alternatives are available within the scope of conscription. A limited form of conscription for the Reserves and/or National Guard, if coupled with a reform of the operation of the reserve system (similar to the Dutch model discussed below) could offset

the deficiencies of the all-volunteer active forces. Such a proposal would result in a substantial increase in the training base and the costs associated with it. There are also a wide variety of enlistment incentives, which could be coupled with a restoration of conscription, that could diminish the shortfalls in the active forces. Similarly, the possibility of universal service could be adopted in which service in the armed forces was one of several alternatives. Of the many types of conscription possible, the latter form is the least desirable. Few will be available in time of war if a nonmilitary alternative is available, and in time of peace, nonmilitary service of a less rigorous sort with greater post-service vocational relevance will almost certainly be in greater demand than military service. Moreover, it would greatly extend the notion of conscription as a "last resort" to provide for the common defense to the alien concept of individual service (a form of taxation) being owed to the state.

The Reserve Forces could be the beneficiaries of substantially greater strength if important reforms were carried out in the Reserve sector as well. While it is unlikely that there will ever be vast numbers of individuals motivated to enlist in the armed forces for long periods of first enlistment, it is entirely possible that a much larger number could be persuaded to enlist for a relatively brief tour of active duty, followed by a number of years in the Reserve forces. Because of the focus of the US Army's doctrine on individual replacement, the structure of the Reserve and National Guard units are not ideally suited to inducing large numbers of individuals to volunteer for Reserve forces. A useful model for the reform of the Reserves, although not wholly applicable to American circumstances, is the system currently employed in the Netherlands. This system is known as the RIM *(Rechtstreeks Instromend Mobilisabel)* System.[49] Under present circumstances, assuming individuals can be induced to join the Reserves, an inevitable consequence of their departure from active duty is a swift loss of military proficiency. This loss of military proficiency requires protracted periods of training before a Reserve unit can be brought up to a condition where it can meet the needs of the active forces in a mobilization contingency.

The RIM system is one ideally suited to a realtively small active cadre supplemented by a much larger Reserve force. The RIM system trains conscripts or recruits to the desired level of proficiency in a company-sized unit. Immediately after the unit completes its training cycle, it is immediately placed *in toto* on "leave" with

their entire unit set of equipment. Unit integrity and the training and experience the individuals gained as a unit is retained rather than suffering the immediate loss of proficiency associated with the dispersal of individuals into Reserve units. There are several variants of this system relating to the length of time of the "leave," details about the place of residence that the recruit is required to maintain, and related matters. The crucial issues for the United States are, however, that it appears entirely feasible to have a competent standing army as well as an effective Reserve force. The prospects for recruiting individuals into the Reserve and National Guard on a unit rather than individual basis is an untried technique that could be usefully examined in the United States. The ability of the United States to increase its reserves could reduce the pressures for a large active force, currently a source of considerable difficulty under the present volunteer system. Even without major reforms of the all-volunteer service, modification of the US Reserve system could be carried out in such a way that would enable the Reserve forces to compete for manpower in the civilian marketplace that would not otherwise be available at all for military service. Such a "solution" is not cost-free. The notion of shifting an active duty training unit into the Reserves requires the procurement of a complete unit set of equipment for that organization. It has been the practice of the US Army to provide "hand-me-down" equipment from the active forces with little emphasis on maintaining the proficiency and equipage of Reserve units at the same standard as active duty units. This is not entirely surprising under circumstances where procurement budgets have been so severely strained that it is infeasible to fully equip the active army. Nevertheless, the prospects of having available a competent and highly ready Reserve force that could result in a tripling of the forces available to the US Army, at an increase in procurement and operations and maintenance cost of perhaps 20 percent over current budgetary levels, is one that should not be ignored.

Prospects for the Modernization of General Purpose Forces

The debate that has focused on defense expenditure since President Carter announced the policy of increasing US defense expenditure three percent in real terms following the 1977 NATO Ministerial meeting has touched off substantial controversy. This controversy has been exacerbated by discussions of raising the average growth rate of US expenditure even further, to as much as five percent as suggested by Senator Sam Nunn. Much of the dis-

cussion however has tended to omit the linkage between the increase in the growth rate of defense expenditure with the modernization requirements of the armed forces. As a practical matter, the Army faces the most extensive requirements for modernization because of the deferred modernization of its forces since the late 1960s owing to the exigencies of the Vietnam War. Virtually every element of the Army's current weapon system deployment is in need of modernization.[50] R&D programs, conducted throughout the late 1960s and early 1970s, have brought forth a set of procurement options the Army has now elected to exercise. These procurement options include a new attack helicopter (the Advanced Attack Helicopter, AH-64), an advanced main battle tank (XM-1), a new infantry fighting vehicle to replace the elderly M-113 series (XM-2/3), a new utility helicopter (the UTTAS tactical utility helicopter, UH-60A), a division air defense gun (DIVADS), a new surface-to-air missile (*Patriot* surface-to-air missile), and a new multiple rocket launcher (the General Support Rocket System). All of these systems are multibillion dollar procurements that under present procurement budgets will take decades to complete. In addition, procurement levels will not provide adequate advanced equipment to Reserve and Guard forces, further diminishing their potential contribution to US readiness. Although current procurement schedules are related primarily to the expected procurement budgets, the operational military requirement may not adjust to the schedule of those who compute the budget.

The Air Force has modernization requirements as well, owing to the emerging obsolescence of the F-4, the mainstay of the tactical air power of the US Air Force and the need to procure additional F-16, A-10, and perhaps eventually F/A-18 aircraft as well. The F-15 aircraft procurement is scheduled to be terminated in FY 81 under current circumstances, although the requirement for additional numbers of the advanced fighter are by no means at an end. In addition to the multibillion dollar procurement requirements for weapon system modernization, there are a host of relatively mundane items that similarly fall into the category of multibillion dollar procurement. In many cases, the need to procure mundane items in substantial quantities reflects the cumulative effects of the disinvestment in defense the United States has undergone since the mid-1960s. For example, the US Air Force has an ammunition deficiency in excess of $9 billion. The US Army has an ammunition deficiency in excess of $3.5 billion. There further exists substantial deficiencies in spare parts, real property maintenance, and the im-

puted costs of the operation and maintenance of additional infusions of new equipment. This litany of the prospect of substantial expense is in an absolute sense rather deterring, but should come to the observer as no surprise when one understands that the Soviet Union has spent more than $100 billion in excess of American defense expenditure since the early 1970s. Figure 4.8 shows a display of US GPF expenditure from FY 80 through FY 85 under assumptions of a decision to allow defense expenditures to expand at varying rates. The rates suggested range from three percent to ten percent and the GPF included in this figure include expenditure for all GPF: Army, Navy, Air Force, and Marine Corps. Taking only the most optimistic set of circumstances, if a decision were made to increase defense expenditure by an annual rate of ten percent from the $50.3 billion expended in FY 79, under such circumstances defense expenditure would grow approximately $6 billion a year in real terms through FY 85. Such a rate of growth would be inadequate to buy out the required modernization of US active forces by that time. Such a vigorous procurement program would simply be inadequate by virtue of the vast cumulative deficiency in GPF procurement. As a consequence for this analysis, one can deduce that growth rates of three to five percent in real terms are unlikely to have a major effect on the capability of US GPF even if they would allow the marginal improvement of those

FIGURE 4.8
Alternative General Purpose Forces Budgets (All Services) in Constant FY 80 Dollars (Billions)

ANNUAL RATE OF GROWTH	FY 80[a]	FY 81	FY 82	FY 83	FY 84	FY 85
3%	51.8	53.3	54.9	56.5	58.1	59.8
5%	52.8	55.4	58.1	61.0	64.1	67.3
8%	54.3	58.6	63.3	68.3	73.7	79.6
10%	55.3	60.8	66.9	73.6	81.0	89.2

[a]General Purpose Forces Expenditures declined in real terms from FY 79 to FY 80 ($50.3 billion in FY 79 to a programmed level of $50.0 billion in FY 80). The figure shown is the amount required to bring defense expenditure up to the growth rate shown from its FY 79 level.

forces as they currently exist. There is simply no alternative to very large investments by historical standards in the US armed forces if they are to be restored to a level of capability that matches US interests. To address the threat posed by Soviet GPF resulting from their cumulative advantage in defense investment, US GPF spending growth will have to exceed 15 percent annually, in addition to important doctrinal and organizational reforms if the United States is to be able to cope with a failure of deterrence.

NOTES

1. *Statement of Secretary of Defense Harold Brown, Fiscal Year 1980 Defense Posture Statement* before the Subcommittee on Defense, Committee on Appropriations, U.S. House of Representatives, February 7, 1979, p. 338. A subsequent budget amendment of $2.7 billion was submitted prior to the completion of Congressional action on the FY 80 bill to compensate for the effects of unanticipated inflation. The funds were recommended for the Military Personnel and Operation and Maintenance accounts only.
2. For a study of territorial defense and how its requirements differ from those of an expeditionary force, see Adam Roberts, *Nation at Arms: Theory and Practice of Territorial Defense* (London: Chatto and Windus).
3. This assertion about the small increases in performance being associated with large cost increases is based on empirical support that the performance gains from technology follow the path of an "S" (logistic) curve, offering increasing returns to scale in its early period of employment, and diminishing returns to scale in its mature phase. This process is explained in E. Jantsch, *Technological Forecasting in Perspective* (Paris, OECD, 1967). Its application to military forces is contained in S.L. Canby, "U.S. Defense Policy: The Problem is Not More Money," *AEI Foreign Policy and Defense Review*, Vol. I, No. 3, pp. 33-34.
4. One area that holds promise of being a revolutionary technological advance is the application of microelectronics to warfare, a change that will affect weapon system performance, intelligence collection and dissemination, and the command and control of forces *if* suitable means of tactical and organizational assimilation of this technology can be found. For a discussion of these issues, see J. Digby, *Precision Guided Weapons* (London: IISS, 1975) and R. Burt, *New Weapon Technologies: Debate and Directions* (London: IISS, 1976).
5. There is a great deal of Soviet literature on military doctrine, but it is difficult to ascertain what constitutes an authoritative presentation. The basic Soviet work on military doctrine is V.D. Sokolovskiy's *Soviet Military Strategy* (translated by H.F. Scott), 3rd ed. (New York: Crane, Russak and Co., 1968). The Soviet military periodical, *Voyennaya mysl'* (Military Thought), declassified in December 1976 by the US government, is also authoritative and contains numerous important studies on military doctrine. Curiously, this periodical, though

treated as classified material within the US government, was not treated as a classified document by the Soviet Union, and could be acquired by anyone in the Warsaw Pact nations.

6. An informative treatise that reviews much of the recent Soviet literature on combined arms concepts and doctrine is J. Erickson's "Soviet Combined Arms Concepts: Observations," *Soviet Military Digest* (Edinburgh: Defense Studies, University of Edinburgh, 1977). An interesting hypothesis on the evolution of Soviet doctrine is contained in P.H. Vigor's "The Soviet Wave Attack Philosophy: The Single Echelon Option," *International Defense Review*, Vol. 12, No. 1 (1979), pp. 43-47.
7. Two important (non-Soviet) views showing the strong historical roots of current Soviet combined arms concepts are: Major General Eike Middeldorf, *Taktik im Russland Feldzug* (Darmstadt: Ergahrungen und Folgungen, 1956) and J. Despres *et al.*, *Timely Lessons of History: The Manchurian Model for Soviet Strategy*. Soviet operations against Japanese forces in Manchuria in 1945 employed combined arms concepts from the European Theater, and are important in understanding postwar developments.
8. A well-documented summary of these debates is contained in C.N. Donnelly's "Tactical Problems Facing the Soviet Army: Recent Debates in the Soviet Military Press," *International Defense Review*, Vol. II, No. 9 (1978). See also, *Soviet Views on Conventional Warfare in Europe* (Washington: Defense Intelligence Agency, 1975).
9. See P. Borgart, "The Air Attack Potential of the Warsaw Pact," *International Defense Review*, Vol. 9, No. 2, April 1976.
10. The author is indebted to Prof. J. Erickson for his description of Soviet combined arms operations in his unpublished monograph, "Soviet Theater Forces and NATO Modernization," (mimeograph), August 1976, as well as further suggestions made to this writer in a private discussion at the University of Edinburgh, December 1978. Also helpful was A.E. Hemesley's *Soviet Tank Battalion Tactics* (Washington: Defense Intelligence Agency, 1977).
11. Lt. Col. L.M. Hansen, "Soviet Combat Helicopter Operations," *International Defense Review*, Vol. II, No. 8, pp. 1242-1246, and Lt. Col. W. Kopenhagen, "Waffensystem Hubschrauber" (Helicopter Weapon System), *Armee Rundschau*, July 1977.
12. German sources suggest that as many as 180 may be deployed in East Germany. See "Kampfhubschrauber Mi-24," *Flug Revue & Flugwelt*, January 1977.
13. See C.N. Donnelly, "Rear Support for the Soviet Ground Forces," *International Defense Review*, Vol. 12, No. 3 (1979), pp. 344-350, and G. Turbeville, "Soviet Logistic Support for Ground Operations," *RUSI: Journal of the Royal United Service Institute*, September 1975.
14. C.N. Donnelly, "Rear Support for the Soviet Ground Forces," p. 347.
15. A tank army (three tank and one motorized rifle division) has a total carrying capacity of 19,000 tons. This implies that the organic logistics lift of a Soviet Front would be able to carry five "basic loads" (BK for *Boevoy Komplekt* in Soviet parlance) for its tanks, 12-15 BK for its

artillery, and five refueling fills for its vehicles without resort to civilian fuel inventories or resupply from rear areas.

16. P. Borgart, "The Soviet Transport Air Force: Aircraft and Capabilities," *International Defense Review*, Vol. 12, No. 6 (1979), pp. 945-950.
17. A more detailed review of recent developments in Soviet tactical airpower may be found in the Schneider, W., "Trend in Soviet Frontal Aviation," *Air Force*, March 1979. Also useful is "The Soviet Air Force: An Offensive Posture and Expanding Capability," *Air International*, No. 6, 1976.
18. An air logistic support unit known as an Aviation Technical Unit *(Aviatsionno tekhnicheskaya chast')* is also attached to each VA.
19. See "Air Power for the Pact," *Flight International*, June 5, 1976.
20. Recent visits of the Soviet *Flogger* to Finland and France have provided more information about the ground attack and intercept capability of the aircraft. See B. Sweetman, "Mikoyan Flogger," *Flight International*, December, 16 1978, pp. 2181-2184. The Mig-23 has numerous variants. The interceptor version is the MiG-23S *(Flogger* B); the MiG-23 *(Flogger* E) is a reduced performance export model. The MiG-23MB *(Flogger* F) is an exported ground attack version. The MiG-23U *(Flogger* C) is a two-seat trainer. Another variant of the *Flogger* has the Soviet designation, MiG-27, and is an advanced ground attack aircraft.
21. See Lt. Col. N. Solovyov, "Artillery," *Soviet Military Review*, April 1978, and Oberst K. Hofmann, "An Analysis of Soviet Artillery Development," *International Defense Review*, Vol. 10, No. 6 (1977), pp. 1057-1061.
22. A very important Soviet work on the subject of Soviet offensive air operations is Col. I.V. Timokhovich, *Operativone iskusstvo Sovetskih VVS* (Moscow, Voenizdat, 1976). The work stresses the importance of reconnaissance and air-ground coordination.
23. The most recent comprehensive analysis of the Soviet literature on theater nuclear warfare is J.D. Douglass, Jr. and A.M. Hoeber, *Soviet Strategy for Nuclear War* (Stanford: Hoover Institution Press, 1979).
24. Hofmann, ibid., pp. 1060-1061.
25. C.S. Gray, "Deterrence and Defense in Europe: Revising NATO's Theater Nuclear Posture," *RUSI: Journal of the Royal United Service Institute for Defense Studies*, December 1974.
26. US Air Force, *The Soviet Theater Nuclear Offensive* (Washington: Department of the Air Force, 1976).
27. F. Kozaczka and J. Ellis, *Nuclear Conflict in Europe: Soviet Options for Discriminating and Selective Attacks* (mimeograph) (Santa Monica, RAND Corporation). J.D. Douglass, Jr., *The Soviet Theater Nuclear Offensive* (Washington, D.C.: Government Printing Office, 1976).
28. The problem of collateral damage remains a serious one for the Soviets as well as NATO, however. See P. Bracken, *On Theater Warfare* (Croton-on-Hudson: Hudson Institute, July 1979), HI-3036-P.
29. The need for the SA-10 has been imposed by the perspective US deployments of cruise missiles. If equipped with a small nuclear war-

head with a high neutron output, the SA-10 would be an effective low altitude ballistic missile defense system. The requirements imposed by cruise missiles—a high performance radar/signal processor to detect an object with a small radar cross-section, and a high acceleration interceptor are a good match with antitactical ballistic missile defense requirements.

30. The European response has been mixed: the UK, intent on overcoming neglected force modernization will meet the objective, but West Germany will fall short; an estimated 1.5 percent rather than the 3 percent previously agreed to.
31. A.J. Alexander et al., *The Significance of Divergent U.S.-U.S.S.R. Military Expenditure* (Santa Monica: RAND Corporation, March 1979), N-1000.
32. The modernization of US GPF has been a major component of the rhetorical posture of the Carter Administration, but *proposed* GPF expenditure declined in FY 80 over FY 79. Owing to the underestimate of inflation, the further disinvestment in defense is likely to continue. See the *Statement of Secretary of Defense Harold Brown*, p. 338.
33. The ability of the Soviets to conduct an unreinforced attack has been discussed in the Nunn-Bartlett report. Most of the controversy over the report was focused on the issue of warning time (i.e., in 48 hours or less) rather than the ability of the Soviets to mount an attack with the assets of the GSFG. See *NATO and the New Soviet Threat: Report of Senator Sam Nunn and Senator Dewey F. Bartlett*, US Senate, Committee on Armed Services, 1977.
34. For a discussion of the US Army Program, see J.P. Geddes, "AH-64: The U.S. Army's Advanced Attack Helicopter," *International Defense Review*, Vol. II, No. 8 (1978) and Statement by Dr. P.A. Pierre and Lt. Gen. D.R. Keith, *Equipping the U.S. Army: A Statement to the Congress on the FY 80 Army RDTE and Procurement Appropriations* (Washington, D.C.: U.S. Army, 1979), pp. 19-23.
35. A brief discussion of the operational problems of precision guided munitions is contained in S.L. Canby, *The Alliance and Europe: Part IV Military Doctrine and Technology* (London: IISS, 1974/5).
36. See Schneider, *op. cit.*, for a description of the role of the introduction of long range/heavy payload aircraft into the Soviet inventory.
37. Soviet helicopter operations are heavily oriented toward support activities deep in NATO territory. Each Soviet motorized rifle division has a company trained in commando operations, and a Soviet airborne regiment is stationed Neuruppin in East Germany with an infiltration mission. See Hansen, "Soviet Combat," p. 1246. This tactical mode will make it necessary for a man-pack surface-to-air missile to be used against helicopters to be widely distributed.
38. One of the few public sources available on electronic warfare is the annual review published by *Electronic Warfare* magazine, *The International Countermeasures Handbook*. As the Soviets perceive EW as a weapon, the very limited public discussion and understanding of this field places the West at a grave disadvantage from the perspective of having public support for an adequate EW program.

39. A well-developed characterization of differing tactical views is provided by S.L. Canby, *Tactical Airpower in Europe: Airing the European View*, TSD-PD-471-1 (Santa Monica: Technology Service Corp., July 1976).
40. "U.S. DOD Defends GBU-15," *International Defense Review*, Vol. 12, No. 1 (1979), p. 15.
41. James R. Schlesinger, *The Theater Nuclear Force Posture in Europe: A Report to the United States Congress in Compliance with Public Law 93-365* (Washington, D.C.: Department of Defense, 1975).
42. For a more complete discussion of the operational problems associated with conducting military operations in a nuclear environment, see Department of the Army, *Nuclear Weapons Employment Doctrine and Procedures*, DA Staff Officer's Field Manual, FM-101-31-1, March 1977.
43. "TNFs: Critical U.S. Defense Requirements," *Commander's Digest*, 1 July 1976, pp. 1-8.
44. The need for the Soviet commander to accept some dispersal of his forces reduces the effectiveness of a nuclear strike directed at his forces, and also makes it more difficult to employ modern precision guided area weapons (e.g., the US Wide-Area anti-armor munition) unless its area of dispersion can be very large. Important opportunities would exist for a maneuver rather than attrition-oriented armed force. See E. Luttwak, "The American Style of Warfare and the Military Balance," *Survival*, March/April 1979.
45. Cruise missile unit costs are approximately $1 to $2 million, depending on payload, whereas a rocket-assisted artillery projectile with a precision guidance system may cost only a few thousand dollars per round.
46. The number of US artillery pieces has declined almost one-third since the early 1970s. The United States has approximately 6,000 artillery tubes in its inventory compared with over 20,000 for the Soviets. See *Air Force Magazine*, March 1979, p. 45. See also *The Military Balance, 1979-1980* (London: IISS, 1979).
47. The US divisional reorganization will result in more numerous but smaller maneuver battalions as well. Soviet practice appears to emphasize unit combat capability, relying for sustained operation on its system of unit replacement, large reserves of equipment, and large reserves available to fill cadre divisions. US practice will probably continue to use its individual ready reserve system, and ultimately conscription as a means of sustaining combat operations. For a discussion of the Soviet reserve system, see R. Woller, *Warsaw Pact Reserve System: A White Paper* (Munich: Bernard & Graefe Verlag, 1978), pp. 105-137.
48. This proposal has been discussed at length by S.L. Canby, "Military Personnel," in W. Schneider, Jr. and F.P. Hoeber, eds., *Arms, Men, and Military Budgets, Issues for Fiscal Year 1977* (New York: Crane, Russak, 1976).
49. The RIM system is discussed in more detail by S.L. Canby in "U.S. Defense Policy: The Problem Is Not Money," *op.cit.*
50. A recent general accounting office report on major weapon systems

provides an illustrative list of some costly but lesser known systems and their program acquisition cost. The cumulative effect of more than a decade of underfunding of defense is staggering: KC-10 Tanker aircraft, $1.05 billion; NAVSTAR satellite system, 1.70; GSRS, 3.50 to 7.00; ROLAND, 2.10; PLSS, 1.67; Joint Tactical Information Distribution System, 3.00 to 4.00; AH-64, 4.00; Total, 17.02 to 21.52. GAO, *Digests of Major Weapon System Reports Issued January and February 1979*, PSAD-79-64, April 25, 1979.

Frequently Used Abbreviations

ABM	Antiballistic Missile System
AEW	Airborne Early Warning
AIRS	Advanced Inertial Reference System
ALCM	Air-Launched Cruise Missile
AMST	Advanced Medium STOL Transport Aircraft
APC	Armored Personnel Carrier
ASAT	Antisatellite System
ASBM	Air-to-Surface Ballistic Missile
ASMD	Antiship Missile Defense
ASW	Antisubmarine Warfare
AWACS	Airborne Warning and Control System
BMP	An Advanced Soviet APC
CAS	Close Air Support
CEP	Circular Error Probable
CMP	Countermilitary Potential
CNO	Chief of Naval Operations
CV	Dual Purpose Aircraft Carrier (Attack and Anti-submarine Warfare)
CVA	Aircraft Carrier (Attack)
CVS	Aircraft Carrier (Antisubmarine Warfare)
CVV	Aircraft Carrier (Vertical/Short-Takeoff-and-Landing Aircraft

C^3	Command-Control-Communications
DOD	Department of Defense
ECM	Electronic Countermeasures
ELF	Extremely Low Frequency
EMT	Equivalent Megatonnage
ERRB	Enhanced Radiation, Reduced Blast (Neutron) Bomb
EW	Electronic Warfare
FBS	Forward-Based Systems
FEBA	Forward Edge of the Battle Area
FOBS	Fractional Orbital Bombardment System
FY	Fiscal Year
FYDP	Five-Year Defense Program
GPF	General Purpose Forces
ICBM	Intercontinental Ballistic Missile
ICM	Improved Conventional Munition
IRBM	Intermediate Range Ballistic Missile
Kg/m^2	Kilograms Per Square Meter
KT	Kiloton
LAMPS	Light Airborne Multipurpose System (Helicopter)
LCAC	Landing Craft Air Cushion
LFO	Large Follow-On
LOW	Launch on Warning
LSD	Large Dock Landing Ships
LST	Landing Ship, Tank
LUA	Launch Under Attack
MAD	Mutual Assured Destruction
MAF	Marine Amphibious Force
MAPS	Multiple Aim Point System
MARV	Maneuvering Re-entry Vehicle
MBFR	Mutual and Balanced Force Reductions
MCM	Mine Countermeasures
MIRV	Multiple Independently Targeted (or Targetable) Re-entry Vehicles
MLBM	Modern Large Ballistic Missile
MPS	Multiple Protective Structure
MRD	Motorized Rifle Division (Soviet)
MRV	Multiple Re-entry Vehicle
MSBM	Modern Small Ballistic Missile
MSC	Military Sealift Command
MT	Megaton
MX	Missile Experimental
NATO	North Atlantic Treaty Organization

NIE	National Intelligence Estimate
PGM	Precision-Guided Munition
PHM	Hydrofoil Missile Craft
QRA	Quick Reaction Alert
R&D	Research and Development
RFS	Relative Force Size
SALT	Strategic Arms Limitation Treaty
SAM	Surface-to-Air Missile
SAT	Strategic Alternatives Team
SDF	Strategic Defensive Forces
SES	Surface Effect Ship
SFO	Small Follow-On
SLBM	Submarine-Launched Ballistic Missile
SLEP	Service Life Extension Program
SNLV	Strategic Nuclear Launch Vehicle
SOF	Strategic Offensive Forces
SRAM	Short-Range Attack Missile
SS	Attack Submarine (Diesel-Electric)
SSBN	Ballistic Missile Submarine (Nuclear-Propelled)
SSN	Attack Submarine (Nuclear-Propelled)
STOL	Short-Takeoff-and-Landing Aircraft
SURTAS	Surface Towed Array Sonar
SWATH	Small Waterplane Area Twin Hull
TOW	Antitank, Optically Tracked, Wire-Guided Missile
UNREP	Underway Replenishment
USMC	US Marine Corps
USN	US Navy
VSS	V/STOL Support Ship
V/STOL	Vertical/Short-Takeoff-and-Landing Aircraft
VTO	Vertical Takeoff
YC	Prototype Cargo Aircraft

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Military Affairs
Political Science

Arms, Men, and Military Budgets
Issues for Fiscal Year 1981

Francis P. Hoeber, William Schneider, Jr., Norman Polmar and Ray Bessette

This is the fourth in the series of *Arms, Men, and Military Budgets* volumes to have appeared since early 1976. The series has delineated the growing Soviet military threat, including the Soviet quantitative advantages, the rapidly vanishing U.S. technological lead, and the manifest Soviet willingness to spend the money to achieve politically as well as militarily usable superiority. The series has consistently recommended specific programs and budgetary measures needed in all major parts of the U.S. forces to overcome the cumulative deficiencies in spending on both procurement of weapons and research and development, and to maintain U.S. technology and potential for meeting future military requirements.

The cornerstone of the analysis has always been the strategic nuclear forces, which when the U.S. had a monopoly and then clear superiority made inferiority in general purpose forces—particularly those for ground warfare in Europe—tolerable. The emergence of parity in the 1970s and Soviet superiority in the early 1980s, confirmed and abetted by the SALT process and U.S. unilateral restraint, has increased the frequency of low-level military activities throughout the world, counter to U.S. interests, and the risk that the world is being made safe for large-scale conventional war.

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